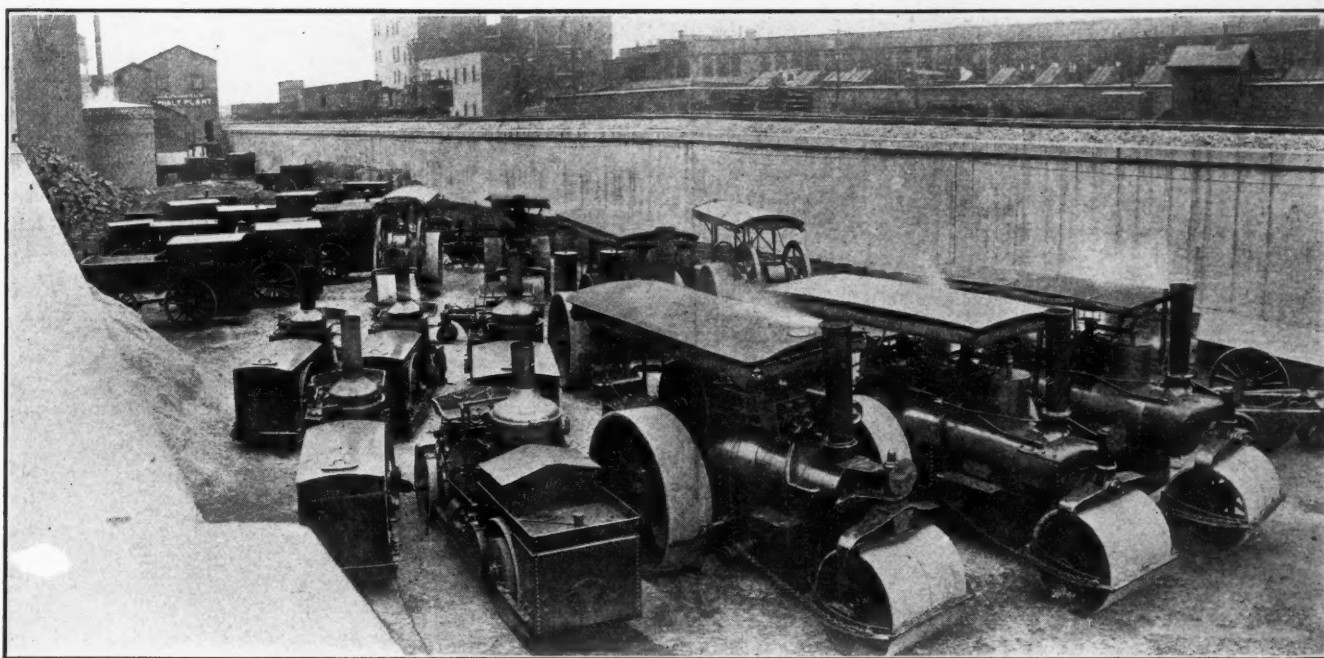


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CHICAGO STREET REPAIR OUTFIT IN YARD OF MUNICIPAL ASPHALT PLANT.

MUNICIPAL STREET REPAIRING IN CHICAGO

Stationary and Portable Plants—Force Employed at Each—Cost of Maintaining Asphalt Pavement by Municipal Plant and by Contract—Repairing Macadam, Brick and Granite Streets

By W. J. GALLIGAN, Superintendent of Streets.

Chicago, Ill., operates its asphalt repair plants on a financial basis different from that employed by most cities. A capital account of \$75,000 is provided to take care of current expenses of operation. Each ward of the city is charged at a fixed price per square yard for repairs made to streets within its boundaries, and the money so collected is paid in to the plant account, while the expenses of making repairs are paid from it. It is the aim to so fix the prices as to show a slight profit for the plant and thus preserve the capital account.

The entire asphalt repair division is under the supervision of Thomas L. Dooley, general foreman of the asphalt repairs, whose extensive experience in the asphalt business makes him an efficient man in this division. The general foreman reports directly to the superintendent of streets, which gives this division the advantage of quick operation.

A stationary plant was constructed in 1912 by Hetherington & Berner at a cost of \$46,000. Since then several additional buildings have been constructed by the Bureau of Streets—namely an office for the plant superintendent with chemical laboratory above; tool and storage house, and a building for the plant force which con-

tains lockers, lavatories and shower baths, the front being used as an office for the scale man, who weighs the material as it comes out of the plant.

This plant has a capacity of 2,000 yards of finished pavement per day of eight hours. It is situated at 15th Place, the width of which is sixty-six feet. This street lies between two elevated steam roads and a sidetrack above is provided to facilitate unloading into storage bins along the wall. This wall is about seventeen feet high. An elevator along side of this wall is used to raise or lower material from the side track. All entrances to the plant are paved with granite block, and a sewer through this street takes care of the drainage of roadways as well as of the pits around the plant. All tanks are put underground where practical.

The plant force is composed as follows:

- 1 foreman of asphalt plant;
- 1 foreman of drum men;
- 2 drum men;
- 3 kettle men;
- 1 mixer man;
- 15 laborers;
- 1 chemist;
- 1 assistant chemist;
- 2 watchmen.

The street repair gangs are two to five in number and are composed of:

- 1 foreman of asphalt repairs;
 - 1 foreman of cut-outs;
 - 3 rakers;
 - 3 smoothers;
 - 3 tampers;
 - 30 helpers;
 - 1 roller man;
 - 2 watchmen.
- Sufficient teams to handle the material.



OFFICE AND FRONT OF ASPHALT PLANT.

This year the Bureau of Streets purchased from Warren Brothers a one-car railroad plant. This plant can be moved around on the outskirts of the city where it is proposed to re-surface macadam roads with a bituminous top. It is practically impossible to do this work from the stationary plant, since the long haul would run the cost up to a very high figure. This railroad plant has a capacity of two thousand square yards of two-inch top per day of eight hours. It is expected that the force required to operate this plant will consist of:

- 1 foreman;
- 2 drum men;
- 2 kettle men;
- 1 mixer man;
- 1 engineer;
- 15 laborers;
- 2 watchmen.

The bureau is considering the use of two five-ton auto trucks to handle the material from this plant to the job. All material to be used will be received on a track beside the plant and can be used as required.

Specifications are now on file for a portable plant to utilize old asphalt top. In all repair work considerable old asphalt is cut out and this must be disposed of. It is rather bulky and is not acceptable for filling where there is traffic, such as alleys and unpaved streets. Hence the disposal of this material and a suitable dumping ground are large factors in the cost of repair. It is the intention to locate the portable plant in some central place where it will be accessible to the street gangs for several months. Old material can then be carried to this plant, crushed and reheated with new material and taken back to the job to be used as binder. In this way the expense of long haul and the waste of old material can be cut down. The capacity of this plant will be ten tons of top per hour, using sand containing 5 per cent of moisture. This plant can be moved by teams, roller or traction engine, and will have clear head room of about twelve feet.

The first year's operation was carried on before the completion of the municipal plant, hence the material was purchased by contract and laid by the gangs from the street department. The showing is necessarily higher, due to the high price of material, and is as follows:

Out of reserve and maintained in 1912,	
sq. yds. asphalt.....	2,059,000
Total sq. yds. repaired.....	76,488
Total cost of repairs.....	\$105,160.52
Average cost per sq. yd. repaired.....	1.375
Average cost of maintenance per sq. yd.....	.051

The year before, this repairing was done by contract and the price bid was exceedingly low. Nevertheless, the average cost of maintenance by contract was \$.057.

The first year's operation with the plant was done in 1913 and the results are exceedingly encouraging, since the plant forces were being broken in and the new machinery worked a little hard, as is usual with new plants. The following results will show for themselves:

Out of reserve, December 31, 1913, sq. yds.....	4,309,200
Maintained by the Street Department in 1913	
sq. yds.	3,547,600
Total sq. yds. repaired.....	147,638
Total cost of repairs.....	\$119,828.63
Average cost of repairs per sq. yd.....	.8116
Average cost of maintenance per sq. yd.....	.0338

The work done by the bureau is of the highest grade. The best material is used and the greatest care and pains are taken to insure the best results. Experiments are made from time to time on new mixtures and their action under traffic is carefully studied. At present the resurfacing of old granite block and brick pavement is being carefully watched and the results will be well known in another year or so. Each year more and more asphalt pavement runs out of the contractor's reserve and falls to this bureau to maintain. It is expected that in time the amount to be maintained will reach such a quantity that the present equipment will be inadequate and an additional plant will be required, located at some point central to the increased area.

Up to the present time the plant has not been run at its maximum capacity and we are not positive of the overload it will manage. There is also a chance that the capacity of the present plant could be greatly increased by slight additions to the present apparatus.

To cut down the large amount of money expended each year on macadam road repair, the superintendent of streets has advised the resurfacing of the roads connecting outlying suburbs with a two-inch top of bituminous nature. These roads will require reshaping and



MUNICIPAL ASPHALT PLANT, REAR VIEW.

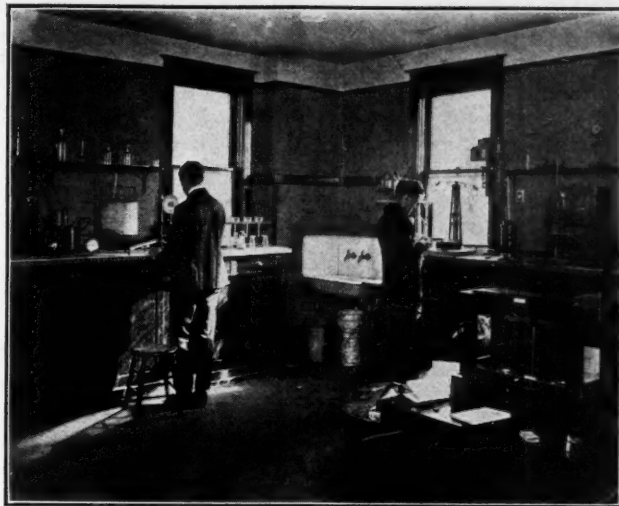
the cost of repair by this method and the addition of asphaltic top should cost about \$.80 per square yard. The present condition of the roads and the length of haul will be the greatest factor in determining this cost, but the ultimate maintenance will be greatly reduced and the conditions of the roads will be greatly improved.

REPAIRING MACADAM.

Although waterbound macadam seems to be the only cheap pavement for outlying roads, it is not advised for city streets, for the dust nuisance is a great source of complaint. The only cheap repair that can be made is to oil and cover with sand, $\frac{1}{2}$ -inch limestone screenings or granite chips. Heavy oil is more satisfactory where great care is taken to apply hot and immediately cover with screenings. The complaint which follows is due to the fact that heavy oil penetrates slowly and is tracked by pedestrians into houses and upon sidewalks. In 1912, 5,311,144 square yards were oiled at a cost of \$.0135 per yard. In all 1,353,753 gallons were used.

Repairs can be made in the following manner. Where the road has a fair thickness, the same can be scarified and additional stone be placed, the same construction being used as on new work. Where it is advisable to lay three inches or more of stone, no scarifying is found necessary. Where the pavement is in fair condition except for an occasional hole or rut, the same can be repaired by cutting out the hole, placing stone and covering the same with asphaltic cement or tar, about $1\frac{1}{2}$ gallons to the yard is found to be efficient. Care must be exercised in cutting out holes, for without proper edges the repair will not last. Merely filling a rut or hole does not insure a permanent repair.

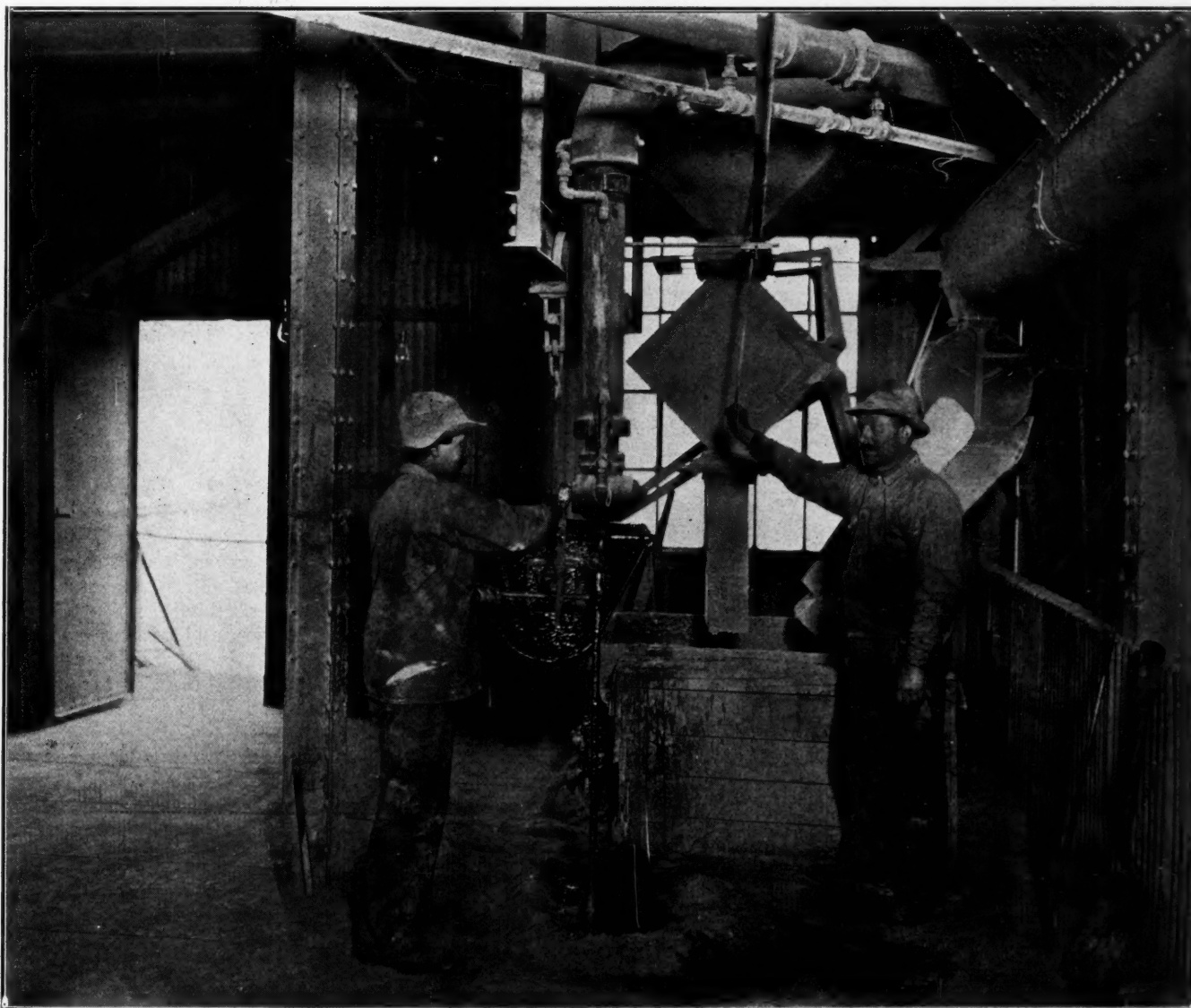
Undoubtedly the best method is to place the roads under the "Patrol System." In this way one man has



CHEMICAL LABORATORY OF BUREAU OF STREETS.

a district or strip to care for, his duties being confined to the maintenance of roads in his district. He is furnished with necessary tools and material, including a tar heater.

The department is considering automobile trucks of 5-ton type for spreading oil on macadam streets. It is felt that one machine will take the place of 3 horse-



MIXING ROOM, CHICAGO MUNICIPAL ASPHALT PLANT.

drawn spreaders and cover the ground in a more efficient manner, to say nothing of the advantage of speed. The manner of hauling crushed stone is also being considered, and two 5-ton trucks will be put into service this season if possible. It has also been advised, in order to maintain quick repairs in the case of emergency, that a 2-ton auto truck be installed. This truck will be operated by the head chauffeur and his duty will consist in keeping all apparatus in working order, and supplying repair parts with the least delay. Bids are now being considered for seven 5-ton automobile flushers and oilers, two 5-ton auto truck dumps and one 2-ton auto truck express. The main object of the Bureau of Streets is to enforce steady and uninterrupted service in all branches, cutting all delays to a minimum.

BRICK.

The bureau had out of reserve December 31, 1914, 1,083,300 square yards of brick pavement, which falls to their lot to keep in good repair. Out of this amount 1,029,000 square yards were maintained.

Total sq. yds. repaired.....	58,284
Total cost of repairs.....	\$58,169.52
Average cost per sq. yd. repaired.....	.998
Average cost per sq. yd. maintained.....	.0565

The work was done by our own forces. The cost of this work the previous year was \$1.31 per sq. yd., the average cost of maintenance being \$.066. Old brick is hard to maintain, due to the fact the brick wears down, and the new block being of greater size, the surface is not uniform; hence the cost of repair is necessarily high. We are now considering the repair of brick which is in extra bad condition with a 2-inch top of sheet asphalt. In the case of subways, the department is in favor of the substitution of granite block for brick.

GRANITE.

In the repair of granite block it might be interesting to note that the cost in 1912 was \$.732 per square yard, which is considerable under the brick cost. Granite can be cleaned and relayed with the best side up to traffic, and in addition it is slow to wear. In some cases where the blocks are badly worn new block must be used. The filler found to give the best results is pitch. On bridge approaches and heavy grades these blocks become slippery and we are now considering the use of a hard sandstone—one which will reduce the slippery condition and which will wear well. At present we are experimenting with block of this type, and feel that in time a suitable material will be found.

PAVING IN NEW HAVEN.

Twelve miles of streets are being paved in New Haven, Conn., this year at a total cost of about \$700,000, fully half of which will be paid by the trolley company for paving along its tracks. A portion of this work consists of laying a new paving carpet over three of the main thoroughfares to connect the city with other towns of the state, these streets leading north, south and west. East Chapel street, leading toward the east, has a comparatively recent concrete pavement in fairly good condition.

About half of the pavement will be wood block and asphalt, which will be laid on the main thoroughfares, while the other half, consisting of secondary or light traffic streets, will be paved with bituminous macadam. In the six miles of bituminous macadam the water-bound macadam taken from the primary streets is being used as a foundation for a 2-inch bituminous wearing surface. Both tar and asphalt are being used as binder.

About \$500,000 was spent in 1913 on street pavements, but these did not include main thoroughfares, but rather the streets in different sections of the city which were

in greatest need of repaving. Work on the present contracts is progressing promptly up to schedule, and it seems certain that all will be completed this fall, with the exception of a group known as the "George street group" of streets, the repaving of which will be left for another year.

The city assessment plan calls for a flat rate for abutting property owners, who pay only about 10 per cent of the paving cost, the remainder being paid from municipal bond issues. The assessment per front foot for wood block is 70 cents, for sheet asphalt 60 cents, and for bituminous macadam 35 cents.

The prices obtained this year are 25 per cent lower than those received by most cities for this year's paving work. Wood block will be paid at \$2.995 per square yard, as against \$3.16 last year. The sheet asphalt price is \$1.68, as against \$2.29 last year; this providing for 6 inches of 1:3:6 concrete foundation, a 1½-inch binder and a 1½-inch top. The bituminous macadam is to be laid at from 63 to 75 cents per square yard, whereas the price last year was \$1.05. C. W. Blakeslee & Sons Company of New Haven obtained all the contracts.

CALIFORNIA HIGHWAY CONSTRUCTION*

One-Inch Layer of Sheet Asphalt on Five-Inch Concrete Base, With Asphaltic Paint Binder—Constructive Methods and Materials

By E. B. RHINE.

On the 23d of July, 1912, the California Highway Commission awarded its first contract for highway construction under the \$18,000,000 bond issue. This contract called for the rebuilding of 5.4 miles of the classic El Camino Real of the padres, lying between South San Francisco and Burlingame in San Mateo county. Mission street, leading out of San Francisco to the southward, connects this beautiful highway, which in turn passes into the Mission Road and the Monterey Road farther down the peninsula.

Contract No. 1 is a portion of Route 2 of the state highway system, traversing the scenic coast line from San Francisco to San Diego via Los Angeles. This highway being the only road directly connecting the suburban towns of Burlingame, Hillsborough, San Mateo, Redwood City, Palo Alto, and San Jose, with the Exposition City, and also the main traveled route for all traffic up and down the peninsula region, it is readily seen that it must be built to carry a fairly heavy city street traffic. It is estimated that about 75 per cent of this traffic is made up of motor vehicles, while the remainder is divided among delivery and grocery wagons, light buggies and an occasional four-horse truck with a 3-ton load. No regular commercial teaming is done on this road, but motor trucks and vans up to 5 tons capacity are frequent.

The old roadway, composed of waterbound macadam, about 12 feet wide and 6 to 12 inches deep, had become badly raveled and deep holes were frequent. On account of the excessive crown acquired from successive metaling there was a fairly uniform cut made on the center line while the shoulders were approximately at grade and only required shaping and rolling. In a few places the cut at the side was 3 or 4 feet deep.

In the design of the pavement it was necessary, for the

*Paper in "The Iowa Engineer," a monthly publication by the students of the Division of Engineering of Iowa State College. Most of the papers in this publication, generally by graduates or professors, are interesting and valuable; but this paper appears to be unusually so.

sake of economy and the lack of available funds, to select a type which would meet traffic conditions and yet be inexpensive. The improved roadway is 40 feet wide. The paved portion is composed of a 1-inch layer of sheet asphalt on a 5-inch base of 1:3:6 Portland cement concrete with an asphaltic paint binder. The pavement is 24 feet wide with a crown of 4 inches on 1.4 miles and 3 inches on the remainder, while earth shoulders 8 feet wide with a slope of $1\frac{1}{4}$ inches per foot carry the drainage to the gutter and afford ample room for all traffic in opposite directions.

The maximum gradient is 4 per cent for a distance of 300 or 400 feet in a few places only, and all changes in grade are joined by parabolic curves from 100 to 400 feet in length. Circular curves of 420 to 5,730 feet radius connect all tangents having a central angle of 3° or more.

The contractor began operations early in August, 1912, but, on account of repeated delays due to financial difficulties and inefficient management, he made little progress. Late in November, when the contract should have been practically completed, he had poured about 6,000 feet of concrete base and the sub-grade was prepared with the stone and sand distributed on it, about 1,500 feet ahead of the mixer. The contractor was no longer able to finance the work, and upon the order of the Commission, the bonding company, as surety for the contractor, took over the contract and placed it in the hands of a second contracting firm. Although this firm prosecuted the work with a well organized force of experienced men, the contract was not completed until late in June, 1913.

Under the second firm most of the loosening was done with a railroad plow pulled by whatever horses were necessary up to 18 horses. A ten-ton traction engine to which was attached an Austin scarifier was used at first as a part of the left over equipment, but the frequent turning around with the engine and the inability of keeping the scarifier squarely in the ground caused such loss of time that this method was soon abandoned. Practically all of the excavation was made with four-horse fresnos, wheel scrapers being used on hauls of 300 feet or more, and also dump-wagons on some of the long hauls.

After the trench was excavated approximately to grade, a gang of laborers with picks and shovels dressed it down to conform to its final crown, making proper allowance for settlement under rolling. As a rule, the old macadam roadbed was broken to several inches below subgrade, and after being properly shaped, was thoroughly watered and rolled with a 12-ton roller. In places where the cut was very shallow for some distance, it was found advisable to dress down the old surface to the true grade with picks, thus utilizing the rocklike foundation, almost as hard and impervious as the concrete itself.

The trench for the concrete base was lined with 2x6-inch planks laid with square butt joints and held true to line and grade by stakes 1x2x18 inches, driven down to about $\frac{1}{4}$ inch below the tops of the headerboards so that a template would ride freely on their upper edges.

Sand and gravel were hauled and dumped on the subgrade in separate rows, properly distributed according to the amount required per linear foot. The subgrade was found to be so compact that the hauling on it without planks, and the subsequent shoveling of materials caused no appreciable amount of earth to be incorporated in the aggregate.

Niles gravel, washed and screened to sizes from $\frac{1}{4}$ inch to $2\frac{1}{2}$ inches, was used on most of the work. Crushed limestone also was used, but was found to be

more difficult to finish. The surface of the concrete was only shovel finished, and the finishing or spreading gang behind the mixer could be reduced by one man when using the gravel. Local "Baden" sand, a fine but sharp river sand containing considerable clay and vegetable matter, was principally used. Great care was necessary to secure an acceptable quality of this sand, but on account of its accessibility and its proximity to the work, it was permitted in place of the "Ocean Shore" sand, a very coarse, sharp sand. "Golden Gate" and "Standard" brand cements were used.

Two No. 6 Foote batch traction mixers were used. One which had been purchased new by the first contractor, was driven by a 12-horsepower Fairbanks Morse gasoline engine; the other, by a 9-horsepower Standard marine type gasoline engine. The former had abundant power so that one operator could hoist the hopper and move the mixer ahead simultaneously without any loss of time, while the other had only power to move itself when the hopper was up or was released from the clutch. It was noted that the concrete flowed more readily and remained more uniformly mixed on delivery from a semi-circular chute than from the flat variety. To partially remedy the slow delivery from the flat one without thinning the mixture too much, the mixer was run on 3-inch planks cut in 5-ft. lengths for easy handling, three being provided for each side, and picked up and placed ahead regularly by one laborer who ran errands and did odd jobs meanwhile.

The water supply was taken from a 44-inch main of the Spring Valley Water Co. through $\frac{3}{4}$ -inch metered connections and carried in $1\frac{1}{2}$ -inch pipes in both directions. The maximum length of pipe from any metered connection was approximately 2,000 ft. Insufficient pressure was obtained, however, and it is believed that nothing smaller than 2-inch pipe should be used.

A complete and very efficient mixer crew was composed of eight laborers shoveling sand and gravel into, and wheeling, six wheelbarrows, one laborer putting in the cement and giving the hoisting signal, six laborers behind the mixer spreading and finishing the concrete, one laborer for errands and odd jobs, a gas engineer and a foreman. The aggregate was measured in wheelbarrows of 3 cu. ft. capacity, so that one barrow of sand, two of gravel or stone and one sack of cement made up the batch. In these proportions it was found that, allowing 10 cu. ft. per linear foot of pavement, there were from 6.7 to 7.5 cu. ft. of concrete in place per cu. ft. of cement used. This variation was principally due to the slight variations of the subgrade from the 5-inch depth required. On the most uniformly prepared subgrade, the average was about 6.9 cu. ft. It was necessary to pour the concrete rather wet on account of the loss of water into the subgrade and to facilitate its movement to place. Although the subgrade was kept thoroughly sprinkled just behind the mixer, it was not desirable to fully soak the ground on account of the men's feet cutting it up so badly. After the concrete had taken its initial set, a steel broom was drawn lightly over the surface to remove the slight film or laitance.

The sheet asphalt surface was composed of sand, limestone dust and asphaltic cement. The sand was made up of a mixture of "Baden Commercial," a very fine sand, "Ocean Shore," a very coarse sand, and "Antioch," a standard asphalt sand in this region, so proportioned that almost perfect standard mixture was obtained. It was necessary, however, to vary the proportions almost daily and to keep a close watch on the way it raked and rolled out on the road to maintain a fine, close-grained surface. The 1-inch layer cooled much more rapidly on the concrete than the thicker layers of $1\frac{1}{2}$ inches or 2 inches usually laid on hot binder. For this

reason it was necessary to send it out from the plant as hot as permissible under the specifications, 325° F., and follow the hot hand rollers with a 5-ton roller just as soon as could be done without the surface picking up. The intermediate size of roller, 2½ tons, was not used after the first day. It is believed that an 8-ton roller could be used to better advantage on this surface on account of the greater compression and the increased length of time of effective rolling possible. Greater density is secured, even with the 5-ton roller, than in the thicker surfaces with correspondingly heavier rollers.

The sand, limestone dust and asphaltic cement were carefully weighed at the plant; the dust and asphaltic cement on scales located on opposite sides of the mixing box, while the sand was weighed in a bottom-dump hopper suspended from the platform of a specially hung scale attached to the sand storage bin. Enough temperatures were taken by the inspector to obtain an average for each load before leaving the plant and this was repeated by the engineer as soon as the load was dumped for spreading.

The binder used is an asphaltic paint so applied that the concrete is given a very thin coat of glossy black appearance. It is composed of one part by volume of asphaltic cement, of the consistency used in the surface, to two parts by volume of engine distillate. The asphaltic cement is heated in a small portable kettle to a temperature not to exceed 325° F. and a measured quantity ladled into a 10-gallon mixing pail. When this has cooled to a temperature of 250° F. the engine distillate is added slowly, to prevent foaming, and stirred vigorously for about one minute, when it becomes a uniform mixture. The concrete surface having been thoroughly cleaned and swept, the liquid is poured on with buckets and swept lightly in a small wave for a short distance. After a few minutes the sweepers go back and sweep the surface clear of all excess paint in the depressions and retouch portions that may for any reason require more. This condition is indicated by a brown surface. An excess of distillate will produce the same appearance, but it will be uniform over the entire surface. The proportion of asphaltic cement to distillate will vary according to the density or porosity of the concrete surface, a lean mixture requiring less distillate than a rich one. It is essential that the paint penetrate the concrete to insure a perfect bond. Any earth or vegetable matter in the surface of the concrete will prevent a bond, while, if the concrete is perceptibly damp, the paint will lie in a thin film on the surface and may be scraped off with the foot. If water falls on this binder before it has thoroughly dried, that is, before the distillate has evaporated and the cement hardened, the water gets underneath and floats the film free from the concrete. The concrete dries out much more slowly under the paint film and it is believed by the writer that the paint, once floated by moisture, never becomes as strong a binder as before. The distillate is gone and it merely dries, or hardens on the surface of the concrete as any bit of spilled asphaltic cement will do. It is, therefore, inadvisable to carry the painting farther ahead of the surfacing at night than what will be covered in the first two hours' work on the following day. Two men can mix and spread the binder on 12,000 square feet of surface per 8-hour day. In fair weather the fresh binder should in no way interfere with the asphaltic surfacing if kept two hours ahead, for by that time it is dry and hard and will not stick to the tires of motor trucks or wagons. Any excess paint left in depressions, such as heel marks, becomes apparent on rolling the hot surface by showing a grease spot and in extreme cases by a bubbling up of the liquid through the surface layer. With ordinary care no such trouble is experienced.

On removing portions of the asphalt surface it is found to be uniformly bonded to the concrete. When picking it loose, or trimming back a joint, irregular chips of concrete are usually pulled up and these often show fracture through one or more pebbles. It is noted that the 1-inch surface on the asphaltic paint binder moves or welts very little under the roller as compared with that laid directly on the dry concrete.

In the specifications for this highway contract the asphaltic paint binder was not included, but was ordered as extra work under a special work order. On the stretch of 5.1 miles on which this binder was used and on which the proportions varied somewhat, it required .077 gallons of engine distillate and .315 pounds of asphaltic cement per square yard of surface covered. The total cost of the asphaltic paint binder, including 15 per cent on labor, was \$0.016 per square yard. It is apparent from this that the asphaltic paint binder, costing a trifle over 1½ cent per square yard, is a cheap binder as compared with the old type used on city streets at 27 cents to 36 cents per square yard. Although its economy is yet to be proven, it has thus far given every assurance of being well adapted to this type of construction.

ROAD MAINTENANCE IN MARYLAND

Oiling Considered Essential—Patrol System of Maintenance—Floating Gang System—Cost of Oiling and Maintenance

In the latest report of the State Roads Commission of Maryland, the subject of oiling roads is given prominence, the commission believing that "a macadam road cannot be said to be finished until it is oiled, nor can it be preserved without oiling." It would be ideal, says the commission, if macadam roads could be completed in the spring or early summer so as to be oiled as soon as the weather is warm enough to secure proper penetration; but in practice, as they are generally completed late in the fall, it is not advisable to apply oil until the following spring, since it will not penetrate properly in cold weather. The road should, however, be put into condition as soon as the weather is warm enough the next spring, rolled down and oiled.

In 1913, the commission oiled 325 miles of road, using 950,000 gallons of oil and covering with 12,000 tons of stone chips. Contracts for oiling in sixteen counties were let to two large concerns in the business, and an oiling motor truck was purchased by the department for such work as could not be given out by contract. There were seven large pressure motor trucks operating in the state at one time. The state truck was made convertible, with two beds, one for oiling and the other for holding stone, chips, gravel, etc.

In maintaining the roads, the patrol system has been adopted. Each patrolman is equipped with a distinctive cap and a conspicuous number on his arm, and a red flag which he is required to set up alongside the road during working hours when either on or off his job. After the system had been in operation for a short time, a competent man on a motorcycle covered each patrol section in the state and reported the mileage under each patrolman, the character and condition of the road, the proficiency of the patrolmen, the cost per mile, the tools and material used, etc.

During the latter part of the year a large amount of stone, chips, gravel and other repair material was systematically stored along the roads at convenient points for use in keeping the roads in repair. One hundred and seven patrolmen were employed on 575 miles of road,

an average of 5.37 miles for each patrolman. There were also employed from time to time, as necessary for extraordinary repairs, 345 assistants to the patrolmen. The number of patrolmen required was found to depend upon the type of road, geological character of the country, grades, amount of traffic, width of road and other considerations. After three or four years' experience with the patrol service, it was decided to introduce this year the floating gang system in connection with the patrol system; this to consist of a gang of experienced men, under a foreman and having a travelling outfit of patching material, tools, etc., which would go over a section of 100 to 150 miles of road in the season, doing the ordinary repairing and maintenance, besides unusual work such as painting bridges, repairing culverts, remedying defective drainage, instructing patrolmen, etc. It was thought that by the use of the floating gangs much of the work could be done better and cheaper, and the patrol sections could be made longer.

The cost of oiling during the past four years has been gradually decreasing from \$374.82 per mile in 1910 to \$246.59 in 1913; while the amount oiled has increased during the same time from 38.4 miles to 326.61 miles. The cost of maintenance (outside of oiling) in 1913, when 575 miles were maintained, was as follows:

Patrolmen, helpers, teams, etc.....	\$70,150.66
98,561 gallons of oil for repair work.....	8,209.25
9,918 $\frac{1}{4}$ tons of stone and chips or grit for repair work	13,620.47
Bridge repairs	3,228.36
Maintenance of turnpikes.....	5,128.47
Travelling repair gangs.....	35,520.76
Patrolmen, tools, etc.....	672.84

Total\$136,530.81

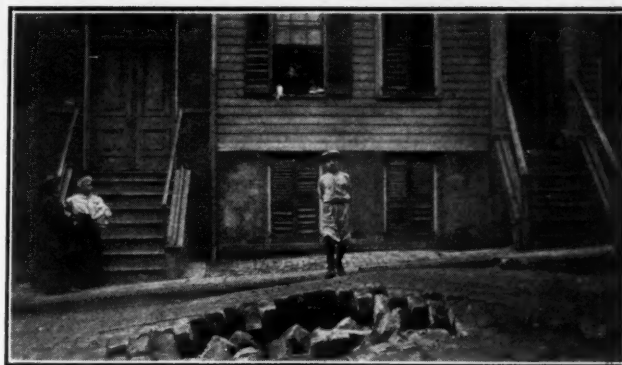
An average of \$237.44 per mile.

PAVEMENT UPHEAVAL IN NEWARK

Granite Block Pavement of Modern Cement Filler Construction Lifted Bodily by Hydraulic Pressure of Sewage—Remarkable Adhesion of Filler.

A remarkable accident occurred to a stone block pavement in Newark, N. J., on the morning of July 7, which has not been accounted for with certainty and probably never will be.

A section of Bank street on a 6 to 8 per cent grade was paved last year with granite block on a concrete foundation, the paving having been completed in September. Through the centre of the street runs an old brick sewer, oval in shape and 3 feet wide by 4 $\frac{1}{2}$ feet high, about 15 feet below the surface. Soon after midnight, following a heavy downpour of rain, some of the residents along the hill were awakened by the spouting of water into the air and others by the rushing of water into their basements. Daylight showed that, beginning at a point a short block below the upper end of the stone block pavement and extending for something over 300 feet, the pavement had been lifted off of its foundation bodily and remained suspended as an arch from curb to curb, while at three points it had been raised in what resembled large blisters, the highest points of which were 15 to 18 inches above the foundation. Near the foot of the hill, slabs of the pavement had been thrown out, one piece being about 2 feet wide by 9 feet long, another about 5 feet square and there being several other sections of pavement but little smaller in area. The largest piece had been turned over with the wearing surface down. Water from a break in the sewer at the upper end of the upheaval was running between the foundation of the stone block paving and was emerging at the lowest break, and had washed

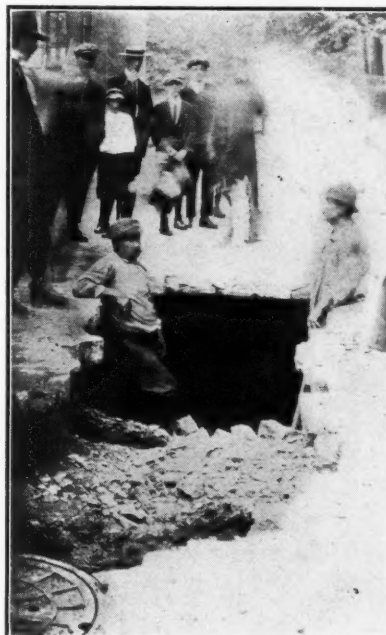


A "BLISTER" WITH THE TOP BROKEN IN.

out from under the pavement practically all of the sand cushion.

A "blister" occurred immediately above each sewer manhole, the only exception being where there were two manholes, one occupying the lower edge of the blister and another the centre of the same. The fact that the pavement rose bodily as a monolith and that under the

violent explosion which threw out part of the pavement the blocks held together in slabs, showed the excellent quality of the grout used, and an inspection of the slabs of pavement failed to reveal any point where the grout had not penetrated to within an inch or less of the bottom of the block. This certainly speaks well for the construction of the pavement, a further indication of the same being the fact that a workman with a heavy sledge was occupied for two or three days in breaking



STONE BLOCKS STANDING AFTER FOUNDATION HAD FALLEN.

down the pavement which extended over a hole washed out at the sewer break, although the foundation here was easily broken down into the cavity.

As to the cause of the upheaval, our own idea is that an obstruction had formed just below the manhole at the upper end of this pavement, which caused the sew-



WHERE PAVEMENT BROKE OUT, FOOT OF HILL.

age to back up until it filled the manhole. The manhole cover being wedged tight, the pressure of the sewage forced out a few bricks immediately under the manhole casting, which allowed the sewage to escape at an elevation just below the paving blocks. The water then worked its way down between the foundation and the stone block pavement to a point at the foot of the hill where for some reason it could go no further, and a hydrostatic pressure was exerted equal to the height of the hill. While in this condition the arch of the sewer broke under the pressure and immediately fell into the sewer with a considerable amount of the back-filling. As the sewage in the sewer and that between the foundation and the stone block pavement were connected, the whole acted as a hydraulic machine and the fall of the mass of material into the sewer acted with explosive effect, forcing up the entire pavement and causing it to give way at the weakest points, which were in each case where the manhole heads extended through the pavement and thus made breaks in its continuity. While this explanation may not seem particularly satisfactory, it is certain that the pavement was lifted from 2 to 18 inches, and no other force has been suggested than that of the water which was flowing in the sewer.

BAY CITY MUNICIPAL LIGHTING PLANT.

The municipalization of lighting plants is advocated by superintendent Fitzhugh, of Bay City, Mich., on economic grounds and for reason of political expediency.

In 1882 a private plant was installed in Bay City which was operated under a "permit," no franchise being granted at that time. This plant sold electricity to the city for street lighting purposes. The poor service and high rates of this plant called into existence the first municipal plant, which was built in 1886 in the eastern portion of Bay City, then a separate municipality. The east side plant was constructed for street lighting purposes only, and did not undertake to do commercial business to any great extent until consolidation in 1905. The west side, known as West Bay City, continued to purchase light from a private corporation for several years longer, but at the expiration of one of its contract periods the price asked for streets lights was so high that the council objected to using that corporation's current. A municipal lighting plant with facilities for commercial as well as street lighting was constructed, and competition started which soon put the private corporation practically out of business, so far as the west side was concerned. In addition to supplying light to small consumers at a lower rate than did the private corporation and lighting the streets of the city at fully 25 per cent less than had been paid before, the city plant was able to meet all demands upon it for extension, upkeep and operation out of its earnings.

When the two cities were consolidated, the west side commercial system was extended to the east side and the demand soon reached the capacity of both east and west side plants. After operating at capacity for several years, and being prevented by court proceedings at one time from increasing the capacity of the plant, the city finally accumulated a sufficient surplus out of its business to buy a new plant, which has just been put in operation. To-day the city's lighting department is doing an increased commercial business which taxes the capacity of Bay City's construction department.

LOCATION OF SHADE TREES

Should be Supervised by City—On What Streets and What Part of the Street to be Planted—Importance of Alignment.

Under certain conditions the presence of rows of trees along the sides of a road operates as a disadvantage in maintaining the upkeep of the road. These conditions obtain most commonly in early spring when the trees tend to retard the melting of the snow, and (more notably on earth roads) immediately after an unusually severe rain-fall, when they tend to retard the drying by evaporation of the roads, which are thus muddy and impassable for a longer time than would otherwise be necessary. This has a tendency to bring the planting of trees along the roadside into marked disfavor.

On the other hand, the presence of trees is an important factor in the prevention of dust upon roads of all kinds. On earth roads, when the roots are not buried too deeply by grading, trees will prevent the rutting and, to a great extent, the wear of the road. On stone roads, where the presence of a certain amount of moisture is necessary in order to prevent excessive wear, trees, by preventing evaporation, aid in keeping the surface moist and thus become an important factor in the preservation of the road. In addition, the expense of laying the dust, whether by sprinkling or by the use of oil, is far less under trees than upon the open road-way. These advantages, when fully considered, will far out-weigh all objections of a financial nature. And then, in the æsthetic development of a city, trees constitute the most important factor. It is recognized by all experts on city planning that avenues of trees of appropriate varieties, planted in their proper positions and cared for in such a manner that they present a neat and attractive appearance, constitute one of the valuable assets of any city. But the qualifying conditions are necessary, for if the trees are of different or inappropriate varieties, or are uncared for, or the spacing is uneven, or the alignment is imperfect, as is almost invariably the case when the planting and subsequent care of the trees are left wholly to the individual owners of the abutting property, the effect is often far from pleasing, even though the results in the way of shade may be attained.

Now, as a matter of law, a city has absolute ownership of and jurisdiction over all trees standing within the limits of the highway. It also has a joint ownership of and a concurrent jurisdiction over all trees that border upon or line the streets. Therefore, when a city neglects to exercise an intelligent supervision over the care and planting of its trees and the trees along the lines of its streets, or fails to extend its line of street trees where needed, that city is guilty of a dereliction of duty and should be subjected to as severe a reprimand as though its duty along some other line were neglected.

In studying this question of tree planting, the first problem to be considered is that of location, or, in other words: Upon what streets and roads ought trees to be planted? Local conditions of course will influence this matter to a greater or less extent, but in general it may be said that trees should be planted on all country roads except where the scenic beauty of the landscape more than compensates for the lack of shade during a hot summer's day. In cities they should be planted upon every street where the volume of traffic is not so great as to eliminate the parking and the frontage of the buildings does not too closely approach the street line. As a rule, both of these conditions prevail in the business sections of our cities, and neither in the residential

portions. Location with reference to distance from the street line is a problem that deserves some consideration, and we find that local conditions are an important factor in determining this matter. Along country roads, where there is no probability of a sidewalk ever being laid or needed, the logical position is from twelve to eighteen inches from the outer street line. This will give the trees ample room to increase in diameter without encroaching on the premises of the abutting owner. If planted exactly on the division line, or whenever they extend themselves beyond that line, it is probable that the abutting owner will have a legal right to attach his fence to them or to make use of them for other purposes. Certain it is that they will in a measure become joint property and the municipality will lose a portion of its jurisdiction over them. It is also important that they be planted at equal distances apart, and in rows which shall deviate from geometrically straight lines only as the road changes its direction by a permanent curve.

In the cities and villages, however, different problems arise to conflict, and the practice of planting trees so near the line though often adopted, is never to be commended. In cities, trees should always be planted on the parking between the sidewalk and the road, except when the volume of traffic is so great that the parking is nearly or quite eliminated. In this case they should, by an arrangement with the abutting owners, be planted on private property and just outside the walk, provided a space of twenty or more feet exists between the building line and the street line. If there is less space and the parking has been obliterated, street trees have no place and should not be planted on this street, though it does not necessarily follow that trees that have already been planted and have made considerable growth should be removed. However it often happens that the attractiveness of a street would be vastly improved were injudiciously placed trees to be removed, and the plea that it will be many years before a tree of equal size can be grown should never be allowed to stand when the tree itself is an eyesore. But when a tree is properly located, the highest skill of the tree-surgeon should be invoked to keep it healthy and attractive. The greatest mistake that a city or an individual ever makes in regard to shade and ornamental trees is when it allows the employees of the street department to hack away indiscriminately in the removal of branches which it seems desirable to remove. Correct trimming of street trees is an operation far beyond the ability of the average street laborer.

It is usually impossible, or at least impracticable, to equally space street trees unless they are planted before the residential improvements are made; but the alignment of the rows should in all cases be perfect. And it is of equal importance that each row shall consist of but a single variety. And it is most important of all that the rows on the opposite sides of a street be of the same variety. The authorities should take a firm stand and see to it that the abutting owners, if allowed to plant trees on the street lines at all, do not disregard any of these rules. It is often urged, as an argument in favor of breaking the alignment or of planting different varieties, that by so doing an effect is produced more closely resembling a natural park in its general appearance. This may be true, but a public street, laid out in squares or in straight lines and not following the contour, is not a natural park and natural park conditions become incongruous when transplanted to geometrical street environments, where, next to the shade and in many instances of even more importance, an avenue of trees of

uniform size, shape and appearance is the object to be attained.

Trees should not be planted at the intersection of the inner lines of the sidewalk, but, when planted on the parking, they should be directly in the outer line of the street, and the remainder of those designed for the same block should be spaced as nearly at equal distances as possible until the next street is reached. When planted outside the street line, a tree should be planted in the intersecting angles of the outer street lines. Spacing is of minor importance, provided the distances are approximately equal. But when the abutting owners go to the opposite extremes and the distances vary from six to sixty feet, the effect is not what it should be and the authorities should see that it is properly done. As a matter of fact, a man never plants trees too close together, but he often errs in not removing a portion of them when they begin to interfere with the growth of one another.

MOVING BUILDINGS IN STREETS

Regulations in New York, St. Louis, Pittsburg, Detroit, Buffalo, San Francisco, Milwaukee, Cincinnati, Columbus and Oakland

By ANDREW LINN BOSTWICK.*

It is the usual practice in American cities to allow buildings to be moved through or across public streets, but only after a permit for doing so has been granted by the proper authorities—generally the Street or Public Works Department of the municipal government. Various conditions are imposed. Often it is necessary to secure the consent of the owners of property adjacent to the present and the future locations of the building; it is usually forbidden to move frame buildings in or into the fire limits; the grantee has to file a bond with the city as security against damage to city or other property, and it is often against the law to move buildings that are seriously damaged or in a dilapidated condition. In some cases all moving of buildings must be done by regularly licensed house movers. Below is a digest of the regulations in force on this subject in 10 cities.

New York.—The several borough presidents are authorized to grant permits for moving buildings through or across public highways, taking in all cases a proper bond to secure the city. The whole matter is in the hands of the borough president. A penalty of \$250 is imposed in cases of violation of the ordinance (for neglect to take out a permit, etc.). (1913 code, p. 61, sec. 269.)

St. Louis.—The street commissioner has authority to issue permits for the moving of buildings, and in the past has exercised this authority. At present, however, the Street Department has practically ceased the issuance of such permits, on the ground that such operations caused an unjust obstructing of the public streets, and paved the way for various minor abuses in the line of permanent street obstruction. It is possible that an attempt will be made in the near future to enact legislation dealing more definitely with this matter, allowing permits to be issued under certain conditions.

Pittsburg.—Pittsburg has no special ordinance governing the moving of buildings, but the practice is to prohibit the moving of frame buildings within the fire limits except with the consent of owners of adjacent property. The matter is in charge of the Bureau of Building Inspection.

*Municipal Reference Librarian, St. Louis Public Library.

Detroit.—In Detroit it is specified that no building or bulky article (such as a boiler) may be moved so as to obstruct in any way the operation of street railways, unless the consent of such street railways is obtained (1912 code, p. 682).

If it is intended to move any building measuring larger than 14 by 20 feet and 13 feet high, over the streets, a permit from the Board of Public Works must be obtained. Permits specify the route to be followed and the time to be occupied in the moving. Provision is made for leaving street crossings clear, and for the erection of suitable barriers with lights around the obstruction at night. A bond securing the city must be filed with the comptroller; persons regularly engaged in the business of house moving may file such bond to cover a year's operations. It is also provided that any wheels used in the moving must be such as not to damage pavements. In cases where the Board refuses to grant a permit, the Council has power to order such permit issued (1912 code, pp. 95-96).

Buffalo.—The Common Council grants all permits for the moving of buildings on or across streets and alleys. Applications are referred to the superintendent of streets, who reports on the value of the building, and whether it can be moved without injury to adjoining property, wires, trees, etc. There is a specified district into which no building may be moved. The superintendent of streets has jurisdiction over the actual work of moving, including the route to be followed (1912 code, pp. 97-98).

San Francisco.—This city regulates the business of house moving, a license of \$25 per quarter being imposed. Only licensed house movers may do work of this sort, except in the case of buildings having a ground area of less than 100 sq. ft. It is necessary to obtain a permit from the Board of Public Works for the moving of buildings on public streets, and in addition a sum of not more than \$100 must be deposited with the Board, and a sum of not more than \$25 with the Department of Electricity, as securities against damage to streets, poles and wires. All permits expire in 15 days. If the above-mentioned deposits are insufficient to cover damage, the grantee is indebted to the city for the balance. Violation of the ordinance entails a penalty of not over \$300 fine, imprisonment or 30 days, or both (Ordinance 1026, 1910 code, p. 646).

Milwaukee.—In Milwaukee no building may be moved without a permit from the inspector of buildings, and if any sidewalk, alley or street is to be occupied in such moving, a permit from the commissioner of public works must also be had. Applications must show the building's present construction, use and location; the proposed location, with diagram of lot; whether the lot contains other buildings; the character of the substructure on which it is proposed to place the building; the future use of the building, and the route to be traversed in the moving.

No permit may be granted for the moving of any building that has deteriorated or been damaged from any cause 50% or more of its original value. No building shall be moved in or into the fire limits unless it is of a construction permissible within the fire limits. Wood or veneered buildings may be moved on the same premises within the fire limits if their height be not increased, and provided that any building used originally as a dwelling be not altered except for office purposes. Violation of these regulations entails a fine of from \$10 to \$500 for each day, or in default of payment of fine, imprisonment for not more than 6 months. (Ordinance passed Aug. 4, 1913.)

Cincinnati.—The Building Code provides that no frame buildings or similar structures may be moved on or across streets or public grounds without a permit from the director of public service—said permit to be approved by the commissioner of buildings. (Bldg. code, 1913, p. 179.)

Columbus.—The city of Columbus licenses house movers. Such licenses are granted by the director of public service, on the filing of a bond of \$1,000. Licensed house movers must obtain from the building inspector a permit for the removal of any building of over \$50 value. The fee for each permit is \$2. (Ord. 23,300, approved April 22, 1907.)

Oakland, Cal.—The regulations in Oakland are the most minute of those in any of the cities under consideration. For the moving of buildings it is necessary to obtain a written permit from the Council, such permit being granted after the filing of an application giving all details as to the character and the location of the building in question, the streets over which it is to be moved, and the proposed new location. The application must also contain the written assent of the persons owning a majority of front feet of lots in the same block on the same street in which it is proposed to locate the building, and also the written assent of persons owning a majority of front feet of lots on the same street in the block opposite the proposed location. In addition to this the application must contain the certificate of the building inspector as to the building's value. On filing his application, the applicant must give notice to owners of property situated within 150 feet of the exterior boundaries of the lot on which the building is to be located.

The grantee must pay to the Bureau of Permits and Licenses a fee of \$25 and \$5 extra for each 1,000 feet the building is to be moved along any street in excess of 1,000 feet measured on the shortest direct line along streets to the point of destination, such distance to be determined by the superintendent of streets. It is also required to deposit \$100 as security with the Bureau of Permits and Licenses. The commissioner of streets supervises the actual work. Buildings so moved must not stand in the street over 24 hours. Railroads and street railways may not be obstructed except between 1:30 and 5 a. m. There is special provision for the cutting of wires where necessary, suitable notice being given—and for the payment for this or any other damage done. There is a specified district in or into which buildings may not be moved. The maximum penalty for violation is a fine of \$300, or imprisonment for one day for each \$2 of fine imposed. (Ordinance No. 89, N. S.; 1912 code, pp. 170-3.)

FLY TRAPS IN RICHMOND, CAL.

An antify ordinance recently adopted by the council of the city of Richmond, Cal., is interesting, because it is a departure in regulations of this kind. It requires that every person in charge or control of any store, market, restaurant, or other place where food or food-stuffs are sold, served, or dispensed, and every owner or person in charge of a public stable, shall maintain in his place of business one or more fly traps properly baited. It fixes the minimum size of these fly traps at 500 cubic inches and makes it the duty of the health department to inspect the traps from time to time to see that they are efficiently maintained.

Dr. Charles R. Blake, commissioner of health of Richmond, states that the city has purchased a large number of traps and that one man's time is given to baiting and attending them.

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AUGUST 6, 1914.

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"Good Roads" and Good Street Paving.

During the year 1913 approximately \$206,000,000 was spent on good roads in the United States, according to the United States Department of Agriculture. Ten years ago the total expenditure was \$79,000,000, or a little over one-third that amount. Of the 1913 expenditure the individual states appropriated \$38,755,088 or about 19 per cent of the total, the other 81 per cent being furnished by counties, townships and other districts. It seems safe to say, however, that without the state aid, which in most cases requires local appropriations before it becomes available, the amount spent would have been very much smaller.

This idea of state aid is now about twenty-three years old. It began when New Jersey in 1891 passed its state highway law, which quickly brought to that state a high reputation for its highways. In the following year Massachusetts and Vermont adopted state aid laws, but the idea did not extend rapidly until the automobile gave it an impetus. In 1904 fifteen states had state highway departments, while at present there are only six states which have not such departments or their equivalent.

But even more important than the fact that state appropriations have resulted in greatly increased mileage of road improvement is the effect of state aid upon the character of the work done. Probably an expendi-

ture equal to at least double the state appropriation has been made under direct supervision of experts furnished by the state, while in a great many states such supervision is granted when asked for and in some is required to be accepted for all improved road work outside of municipalities. The effect of this upon the character of the work done has undoubtedly been of the greatest importance.

As so much good has resulted from the assistance given by the states and by the Federal government in planning and constructing good roads, there would seem to be equally good reason why state and Federal advice and aid could be given advantageously to municipalities in connection with street pavements, especially to the smaller cities and towns which cannot afford to employ the highest grade of engineering talent. The farmer now has at his disposal the best expert service available to advise him concerning his crops, his live stock, and now concerning the roads which he uses; but the cities, with their enormous populations, cannot look to the Federal government for advice on any of those subjects which are of peculiar interest to them. Possibly the nearest approach to this are the public service commissions which now exist in several states.

Why should not the Federal government maintain a bureau of public utilities, which should have at least as much authority and available funds as the Bureau of Roads of the Department of Agriculture? Our city officials need advice concerning street pavements, sewers, water works, street lighting and numerous other of the public utilities and functions which form so important a part of the life and activities of a modern city. Those cities which can and are wise employ expert advice on these branches of applied science; but many are not wise and many small municipalities are too poor and the federal bureau could render service in such cases. It could also conduct investigations which are greatly needed, but which no one individual or city could carry through—such as studying the run-off from sewered areas and other subjects which committees of engineering societies investigate from time to time.

Stone Block Pavements Without Foundation

One of the conditions found to exist after the upheaval of the stone block pavement in Newark, described elsewhere in this issue, namely, the fact that, after the foundation of the pavement had fallen or been broken down into a cavity washed from under it, it was found extremely difficult to break down the pavement itself with heavy sledges, and the entire pavement seems to be practically monolithic; this condition suggests the question whether, in the case of a pavement with so much strength for acting as a beam, it is necessary to provide a concrete foundation which is less strong than the pavement itself.

If we could be sure that a stone block pavement was to be constructed throughout as substantially as this one, why could not the foundation be omitted altogether without in any way weakening the pavement, and thus a considerable proportion of the cost be saved? Under such conditions an accurately graded and well rolled sub-base and a 2-inch sand cushion would seem to be ample, especially on comparatively steep grades where there would not be very heavy teaming. If this construction were adopted, it would reduce the cost of a granite block pavement and enable it to compete on more nearly an equal cost basis with other pavements adapted to similar localities.

On fairly steep hills macadam washes badly, wood block and asphalt are too slippery, and granite block

would be less slippery than practically its only competitor under these conditions—brick.

This may seem like a reversion to the practice of a generation ago, but there is the very important distinction that in those days the sub-base was very seldom rolled, and the blocks were laid with joints three-quarter of an inch to an inch wide filled only with gravel and tar, which kind of joint filler affords the pavement little strength to act as a beam in distributing loads over the foundation or in bridging soft spots or settlements over trenches or other excavations.

The Newark pavement was partly supported, it is probable, by acting as an arch, the curbs taking the thrust, and this could not ordinarily be relied on, but the strength of the slabs thrown out and that portion over the washout indicate considerable strength aside from this.

MOTOR TRUCKS IN NEW YORK SUBWAYS

Used on Comparatively Short Hauls for Removing Dirt and Bringing Concrete—Time-Saving Devices— Time Schedules and Cost.

Several contracting firms are using motor trucks on the present New York subway extension work to advantage, among these being the P. McGovern Company, the Bradley Construction Company and the McMullen, Snare, Triest Company. The last-named firm uses three 7-ton Mack trucks in hauling concrete from the central plant at the foot of 125th street to various places along Lexington avenue and in the vicinity of 125th street.

The Richard Carvel Company, Inc., which is working along the Southern Boulevard and 138th street district, is making greater use of motor trucks than are any of the other contractors on this work. This company has seven trucks at work, mostly Locomobile and Garford trucks, and uses them for shorter hauls than are considered most advantageous for motor trucking. One haul is as short as 1,200 feet, and another is a half-mile haul, the dirt in the latter case being shoveled directly into the truck by hand from the street level. These trucks are run almost continuously, being in constant use about 18 hours out of the 24. It is claimed, however, that they would show a substantial profit on a 10-hour period of operation.

On the 1,200 foot haul, precautions are taken against losing time in loading and unloading. Immediately on arriving at the loading station, the truck is backed into place and a 2½-ton bucket of stone and dirt is loaded on the truck by a derrick. This bucket rests on skids placed on the bed and is kept from moving by its own weight. At the unloading station, the bucket is removed by means of a derrick. On every third trip three empty nested buckets are loaded on for the back trip. On the other two trips, the truck starts back as soon as the loaded bucket is swung clear. A saving of about three minutes on each of two out of each three round trips is made by this means, since four minutes are consumed in unloading and replacing the empty buckets and only one minute in unloading. At the loading end, there is no time lost nor gained by this method.

AVERAGE SCHEDULE FOR 1,200-FOOT HAUL OF 2½- TON BUCKETS.

Loading..... 3 minutes
Hauling..... 13 minutes (round trip, including delays)
Unloading..... 2 minutes

—
18 minutes for 2½ tons, or 8 1-3 tons per
hour, or 83 1-3 tons per 10-hour day.

The long time haul was required because of frequent delays due to crowded streets, waiting for other trucks, etc.

On the half-mile haul, the dirt is dug from the street and shoveled directly into the trucks. Six men will fill a truck in slightly over 20 minutes, loosening the dirt and throwing it over the edge of the truck which is about seven feet above the street, and handling some of it twice. The dirt is carried about one-half mile and dumped by means of hand winches on the truck. No special time-saving devices are resorted to in order to decrease the cost. Horse trucks are used on the same job under nearly the same conditions.

AVERAGE SCHEDULE FOR HALF-MILE HAUL OF DIRT, HAND LOADED.

Garford Trucks. Hauling done up grade.
Loading..... 20 minutes
Hauling..... 14 minutes round trip
Unloading..... 6 minutes

—
40 minutes for each 3-ton load, or 45 tons
per day of 10 hours.

COST OF LOADING, HAULING AND UNLOADING.

Motor Trucks.

Chauffeur	\$3.00 per day
6 men excavating and loading.....	10.50 per day
2 men unloading.....	3.50 per day
Gasoline	1.50 per day
Repairs, depreciation and expenses.....	4.00 per day

—
\$22.50

Or, at 45 tons a day, 50 cents per ton for one-half mile haul.

Horse-drawn wagons also are used on this half-mile haul—about twice as many as motor trucks. The time and cost of most of these was as follows:

AVERAGE SCHEDULE.

Cost.

Loading..... 10 minutes
Hauling..... 30 minutes
Unloading..... 6 minutes

—
46 minutes for each 1½-ton load, or 2
tons per hour or 20 tons per day.

Cost.

Wagon and teams.....	\$5.50 per day
3 men excavating and loading.....	5.25 per day
2 men unloading.....	3.50 per day

—
\$14.25

Or, at 20 tons a day, 71¼ cents per ton for half-mile haul.

The McMullen, Snare, Triest Company makes use of three 7-ton Mack trucks to haul concrete from the central mixing station at the foot of 125th street to various places along Lexington avenue. They find it cheaper to maintain this central plant and cart the concrete to the work, than to cart the materials and mix the concrete on the job. This concern, by cutting the waste time in loading and unloading very closely, finds the trucks profitable with a haul of only 3,000 feet. The concrete mixer at the foot of 125th street is elevated so that the trucks back directly under the spout. This discharges concrete into the body of the truck, which is made sufficiently light to hold the mixture without leakage. At the unloading end, the truck is backed up to a flaring chute (which conducts the concrete to the sub-surface work) and the body is tilted. The actual time of loading is about 2 minutes, including backing the machine into position and other delays. The time of unloading is about the same. Each truck averages about four tons per load, and makes the round trip in slightly over 9 minutes, giving about 18½ tons per hour.

The WEEK'S NEWS

Large Bridge Contracts in Iowa—Country Work in New Jersey and Kansas—City and County Road Taxation in Youngstown, O., and Richmond, Ind.—Flood Protection in Muncie, Ind.—Proposed Beach Esplanade for San Francisco—Sewage Disposal in Emporia, Kans.—Another Pittsburgh Sewer Explosion—Water Troubles in Many Cities—Philadelphia's Utilities Bureau—Fires and Motorizing—Work on New Piers in Providence, R. I.

ROADS AND PAVEMENTS

\$1,000,000 Bridge Contracts in Iowa.

Des Moines, Iowa.—Iowa counties have let a million dollars' worth of bridge contracts since January 1st. They will let contracts for probably half a million more before the end of the year. These figures cover only the work which has been contracted at public lettings. They do not cover the small work that has been let privately. They do not cover any part of the bridges and culverts the ninety-nine counties are building by day labor. Engineers in close touch with the situation estimate that the day labor work and the small private contract work will total at least another million dollars for the first half year. Polk County heads the list with contracts totalling \$99,589. Marion County is second with \$78,767. Clayton is third with \$45,701, and Clay fourth with \$42,735. In forty-two counties no public lettings have been held. These counties are either doing all their work by the day labor system or are completing work contracted for last year. Several counties have held two lettings and contemplate others. The following shows the total contracts in all counties which have held public lettings:

Audubon, \$12,477; Benton, \$21,708; Black Hawk, \$10,000; Bremer, \$12,855; Buena Vista, \$6,571; Butler, \$11,487; Calhoun, \$14,192; Cedar, \$14,951; Cerro Gordo, \$31,900; Cherokee, \$15,168.50; Chickasaw, \$20,515; Clay, \$42,735; Clayton, \$45,701; Clinton, \$25,000; Crawford, \$15,888; Decatur, \$3,360; Delaware, \$3,206; Des Moines, \$4,204; Dickinson, \$19,783; Dubuque, \$6,786; Emmet, \$12,051; Fayette, \$17,992; Floyd, \$13,510.36; Franklin, \$12,222; Greene, \$9,945; Grundy, \$12,983.40; Guthrie, \$6,569.78; Hamilton, \$24,112; Hancock, \$7,200; Harrison, \$10,364; Howard, \$7,246; Humboldt, \$10,805; Ida, \$25,368; Jasper, \$20,659; Jones, \$10,101; Kossuth, \$9,447; Lee, \$4,231; Linn, \$13,568; Lyon, \$21,536.36; Mahaska, \$14,733.01; Marion, \$78,767.86; Marshall, \$5,880; Mills, \$4,782; Monona, \$2,648.22; O'Brien, \$11,708.05; Pocahontas, \$15,200; Polk, \$99,589; Pottawattamie, \$15,968; Scott, \$9,704; Sioux, \$25,555.45; Story, \$38,550; Tama, \$26,373.53; Washington, \$3,767; Winnebago, \$2,539.55; Winneshiek, \$8,000.75; Woodbury, \$24,622; Worth, \$10,741.

New Jersey County Work.

Newark, N. J.—Middlesex county, the records of State Road Commissioner Stevens shows, leads the whole state in scientific road building. This county was the first to take advantage of this state aid law nearly 25 years ago, and it has also gone furthest in putting down highways that will stand the test of the vastly heavier traffic of the last few years. Macadam, with a bituminous, or asphalt, dressing has been found to be satisfactory for county roads. Up to the time the last report of the Road Department was published, this county had 108,416 square yards of that kind of pavement out of a total of 642,685 for the entire state. The only other county approaching these figures is Hunterdon, which had 104,514. The next highest was Warren, with 70,530. Altogether 1,242,077 yards of macadam have been laid by Middlesex county. The next highest is Mercer, with 1,221,139, including all other types of roads, the principal one of which is gravel. Burlington, which has nearly twice the area of Middlesex, comes first with 1,529,776 yards, and Middlesex is second with 1,506,290.

Road Work in Shawnee County, Kans.

Topeka, Kans.—In the last two years Shawnee County has spent an average of \$666.63 a mile on designated county roads of which there is today a total of 153.1 miles, not including bridge work. Shawnee's total account for county roads and bridges, exclusive of the township roads, to which the county contributes only in cases of emergency, in the last two years, ended June 30, has been \$182,870.01. For the last two years the county has levied a tax of 7.5 cents on the hundred dollars for road and

bridge building and maintenance funds, collecting this tax on all the property of the county and city, but spending all the money outside the corporate limits of Topeka. In accordance with negotiations between Shawnee county's board of commissioners and the boards of trustees of the several townships, the county has agreed at its earliest convenience to assume the maintenance of 64.1 miles more of road, additional to the 153.1 of designated roads, which are the principal highways all over the county. Besides this prospective added expense, the county faces the necessity of expending not less than \$30,000 on county bridges, for which insistent demands are made from various parts of the county. The estimate covers the prospective cost of replacing several of the old wooden bridges which are rotting out. In addition to expenditures mentioned, Shawnee County spent \$1,441.35 in 1913 for opening roads, most of which are maintained by township expense, and \$1,811.45 in the fiscal year just ended. While most of the county roads are merely graded and provided with concrete culverts of a permanent character, nearly 40 miles have been improved in a more or less permanent way. The use of gravel, macadam, oil and brick is given as follows:

Graveled roads	32.80 miles
Macadam	4.65 miles
Oil	3.50 miles
Cinders	1.50 miles
Brick50 mile

Traffic Count for Bridge Planning.

Bridgeport, Conn.—In order that the Stratford Avenue Bridge Commission may arrive at some definite information as to the size and strength of the bridge they will soon construct, City Planner John Nolan has proposed that an actual count of the traffic over the bridge in both directions be taken on two days. The plan met with general favor among the commissioners. Two shifts of eight policemen each and several collectors will be stationed both days for the purpose of distributing small cards on which pedestrians and drivers of vehicles will be requested to furnish information as to where they come from and what is their destination. These cards will be collected on the present Stratford avenue bridge.

Youngstown Has Legal Road Puzzle.

Youngstown, O.—What promises to be a nice legal question has been raised by city council. The question, which will be taken to the attorney general, is: "Is Youngstown a part of the good roads district mapped out before the township was taken into the city?" Included in this is the question as to whether Youngstown township's representative upon the good roads commission has a life position. The council intended to instruct City Solicitor George J. Carew to start injunction proceedings to prevent the good roads commission from selling a \$60,000 paving bond issue. It is declared that the city of Youngstown has to pay 90 per cent of the bonds and interest for the road improvements in this district, comprising Austintown, Coitsville, Jackson and the old Youngstown townships. The city solicitor is of the opinion that injunction proceedings were not the proper course to pursue and suggested that quo warranto proceedings in the supreme court would be the most expeditious method of having the question settled. Council approved this suggestion and the city solicitor will enter quo warranto proceedings within a short time.

In 1905 the good roads commission law was passed, pro-

viding that the township trustees appoint commissioners it fifty owners in any two townships or any four townships petition for them. If this were done the trustees were to appoint one man from each township in the district. At that time the present district comprising the four townships was laid out and the commissioners were appointed. The proposition of levying a tax for good roads was placed before the people and the voters approved it. At this time the maximum bond issue in a year was \$250,000. Since then, however, a state law has amended this, raising the maximum bond issue to three mills on the tax duplicate. In 1905 when the tax duplicate was \$40,000,000, the maximum was \$250,000, but today with the estimated tax duplicate at \$160,000,000, the maximum bond issue may be \$4,800,000, and with the city of Youngstown paying 90 per cent of the issue and the interest, the city officials are of the opinion that it is time to call a halt. The commission has issued \$1,000,000 worth of bonds to date and proposes to make another issue of \$60,000 for the Austintown road.

The law provides that a commissioner shall hold his office until another is named by the township trustees to take his place. The annexing of the township to the city, automatically threw out of office all of the township officers. At present there is no one with authority to take any action whatever in the case of the commissioner from the former Youngstown township and it appears that he has a life position on the commission, if there is a good roads district left after one township has been taken away.

To obtain the advantage from the \$5,000 a mile offer or the \$30,000 offer for the six miles to be repaved, council decided to drop the injunction proceedings against the \$60,000 bond issue and allow the city solicitor to take the matter up to the supreme court.

Lengthening Bridges for Flood Prevention.

Muncie, Ind.—The work of lengthening the bridges in and around Muncie, in accordance with flood prevention plans, is progressing satisfactorily and before winter all the main bridges across White River and leading into the city will have been completed and in readiness for the floods. One of the chief causes of the waters from White River spreading over a large area in March, 1913, was the narrow and short-span bridges that acted virtually as a dam for the waters. Investigations by local authorities and experts from the government's corps of engineers proved that longer spans and higher bridges would eliminate in a great measure, the danger of floods. On the High street bridge new span, which will be ninety feet long on the north, and sixty on the south, is being built. This will give the waters a greater space and will not throw the current over Wheeling avenue. The floor will be of creosote block. On the bridge on West Jackson street, there is a new sixty-foot span being erected. The

structure is of steel and a creosote block floor will be constructed. The flooring in the Broadway or Whitely bridge will be torn out and a creosote block floor put in. County Surveyor Horace Webber and his assistant, Morley Hedgeland, are in charge of the county's work. All of the steel work is being done by the Indiana Bridge Company.

Richmond, Ind., Road Law Burden.

Richmond, Ind.—Richmond taxpayers, who in the last few years have felt the greatly increased township tax rate because of the three-mile gravel road law, which has resulted in the improvement of a number of roads at the expense of the township as a whole, are hopeful that the next session of the Indiana general assembly either will repeal the law or will modify its features so that there shall be some limit placed on the amount of money a township may spend in a year. The situation that presents itself in various counties of the state is found in Wayne Township, in which Richmond is situated. One of the most expensive improvements made under the three-mile law in Indiana cost \$50,000 and the complaint was never raised that the contractor did not fulfill his obligations, for it is admitted that he did, but the specifications, calling for a crushed stone road of the full ditch width of the roadway, with objectionable curbs and gutters, were the objectionable features. The crushed stone roadway is wearing out rapidly, the national road being the most used of any turnpike entering Richmond. It has been pointed out that for the same money the road could have been bricked to a width of thirty feet, thus giving a permanent roadway. The cost was paid for by the taxpayers of the township as a whole, and the abutting property owners, who receive the most benefit, paid no more on their taxable wealth than the citizen in the most remote part of the township. In the city of Richmond the sting has been most severe, for the taxpayers of the city have been compelled to bear the brunt of the gravel road costs in Wayne Township and the road rate, in addition to city, county and state, has made the levy higher than ever before.

Propose San Francisco Beach Esplanade.

San Francisco, Cal.—The Chamber of Commerce is urging the citizens to ask the Board of Supervisors to authorize a bond election for an ocean beach esplanade, the plans of which have been prepared by the Board of Park Commissioners. The plan embraces the improvement of three miles along the Pacific shore and includes five principal projects: a bulkhead for prevention of storm damages; a promenade next to this, twenty feet or more in width, for pedestrians, and stairways leading to the beach—this promenade to be illuminated at night and include shelter places with glass fronts and a handstand; a strip of parking inside of the promenade with one or more public comfort



SAN FRANCISCO'S PROPOSED THREE MILE BEACH ESPLANADE

stations; a good paved and oiled roadway; an equestrian pathway between another park strip and the eastern sidewalk. The esplanade would cost about \$1,000,000—or, on a million-dollar bond issue for forty years the interest would need less than one cent on each \$100 assessed valuation.

SEWERAGE AND SANITATION

Emporia's Sewage Disposal problem.

Emporia, Kans.—The state board of health has notified the city commission that Emporia must stop using the Cottonwood River as dumping place for its sewerage. In a recent letter, Dr. S. J. Crumbine, secretary of the board, put the matter up to the commission. As the town is situated it is apparently an engineering impossibility—according to the surveys made at previous times—to drain the north district into a sewage disposal plant near the present outlet of the sewer into the Cottonwood River. It will be necessary, members of the commission have been told, to build a second plant north of town to take care of this district. This plant probably will be much smaller than the one which will serve the town generally. Mayor R. M. Hamer thinks it would be a good plan to build this smaller plant first, and to observe its workings and the satisfaction it gives before the erection of the larger plant. The commission probably will take the matter up at a meeting soon. No steps will be taken, however, without expert engineering advice. The two Emporia plants will entail the expenditure of many thousands of dollars.

Sewer Explodes While Being Repaired.

Pittsburgh, Pa.—Twelve men were injured, four seriously, when a new sewer being constructed in Thirty-third Street blew up, ripping the thoroughfare from Penn Avenue to the Allegheny River, with loss estimated at more than \$150,000. The sewer was being built to replace one that exploded last fall, injuring several persons and causing loss of more than \$250,000. In this last explosion the sewer let go in three different places. Men at work in the sewer claim to have smelled gasoline shortly before the explosion. Director Robert Swan, of the Department of Public Works, ordered an analysis made of the gases in the sewer. At the beginning the regular councilmanic sessions steps will probably be taken to insure the protection of the sewer hereafter. It is suspected that gasoline from garages in the vicinity are the cause of the trouble.

To Keep Gasoline Out of Sewers.

Schenectady, N. Y.—A new plumbing code has been promulgated by the Examining Board of Plumbers acting under the direction of Commissioner of Public Safety W. W. Wemple and Health Officer J. L. Schoolcraft. The manner of disposing of the waste oil and gasoline from garages is to be regulated. Restrictions in this regard were deemed necessary due to the great fire hazard caused by the present method of allowing these inflammable materials to go down the sewers along with the water. The new section read and obeyed by every garage owner is as follows:

"Waste pipes or garages must be protected by trap or pit approved by the Board so arranged as to prevent the passage of gasoline fumes into the sewer. Such trap or pit must be ventilated by a pipe at least two inches in diameter leading to the outer air, no less than ten feet above the ground and at least fifteen feet from doors, windows and porches."

Extending Sewer Outlet.

Burlington, Vt.—The street department has purchased 30 car loads of iron piping, six feet in diameter, and this will be used to carry the outflow from the outlet of the main sewer 600 feet into Lake Champlain. The present antiquated box pipe wooden arrangement used as a carrier was built in 1874, just 40 years ago. It first consisted of a wooden box of heavy plank built square and extending in a trench directly west from the shore at the outlet. This wooden box allowed the sewage as it came from the underground main to follow the passage for some distance out from land. It gradually rotted away, however, until for some years the sewage has been running in the trench without cover. Conditions became so offensive that the Rutland Railroad company complained

to the authorities and the urgent need of taking action in the matter was emphasized. The city has a long trench diagonally southwest from the outlet and has diverted the sewage temporarily, while the new pipe is being laid. The pipe will be laid and covered in cement for greater permanency. Men and teams are already hauling the big inner tubes to the scene. Each pipe weighs about four tons. They will be laid in the same trench as before the wooden box, or what remains of it being removed.

Disposal Plant Must Be Reconstructed.

Antigo, Wis.—That grave defects in the sewage disposal plant prevent its proper operation, and that in order to correct them important alterations are necessary which include the reconstruction of a large portion of it, is the statement of City Engineer Henry Olk. The plant was completed and turned over to the city last December. It was constructed at a cost of \$100,000.

WATER SUPPLY

Lawrence, Kans., Water Situation Grave.

Lawrence, Kans.—The condition of the water supply in Lawrence is such that the commissioners have been holding several secret sessions a day, considering a remedy for the famine. The water company insists that the only solution is an immediate increase in the franchise—but the commissioners hold out. At one meeting between the state board of health, the city commissioners and the water company, Dr. J. J. Sippy of Topeka was here representing Dr. Crumbine and the state board of health. He let it be understood that the board of health would not permit the use of river water under any conditions except a serious conflagration. The university here has offered to lend the water company a five-inch centrifugal pump with which to get more water out of the wells. The water company made the claim that they had searched far and wide for a pump and were unable to find one for the purpose, so they were forced to accept it. However, the company does not hold out a hope that the pump will better the conditions. It was necessary to secure a motor with which to run the pump and a line was built to the plant. Whether to throw the company into the hands of a receiver, to take it into court and annul its franchise, to allow an increase of rates in the hope that the company will then be able to get the water necessary, or whether to start agitation for an entire new waterworks system to be owned by the city; these are some of the possibilities open to the commissioners. A called meeting of the city commission resulted in the passing of an ordinance prohibiting the use of city water for sprinkling purposes. This ordinance will go into effect immediately and will be in force for 60 days. It will be a misdemeanor to use city water for sprinkling of lawns or streets, and a fine of \$1 to \$100 may be assessed for the violation of this statute. The company, meanwhile, insists that from \$75,000 to \$100,000 are needed for making improvements in the plant in order that good service may be given and that this money cannot be borrowed unless the company has its franchise extended.

Filtration Plant Completed.

Knoxville, Tenn.—Knoxville is now getting additional water filtration of 3,000,000 gallons of pure water a day. The sediment tanks have long been completed to handle this amount, and Engineer James P. Van Duyn, who is in charge of the work of construction at the city waterworks plant, has announced that the water connections have been made, the steam connections completed, and the sand and gravel for the filters distributed properly. The improvement was begun before April 1. Chemical tanks have been constructed of reinforced concrete. There are four new filters, each with a capacity of filtering 1,000,000 gallons a day, totaling a possible 4,000,000 gallons of water.

Bloomington's Water Problem.

Bloomington, Ind.—Members of the State Public Service Commission are attempting to settle the problem of providing the city with an adequate supply of water. The commission is here as the result of a petition of the business men of the city asking that it come and investigate

the various water sites that are under consideration and make recommendations to the city. The recommendations will be upon the question of whether the city needs an additional supply and will not interfere with the work that is being done on the Leonard's Springs extension to the water works system. Work on this extension is being rushed as rapidly as possible and it is expected that the new system will be in use within sixty days. The City Council has a force of fifty men and twenty-five teams grading and making the concrete work for an immense dam, which will catch water from two large springs that are running 320,000 gallons of water every 24 hours. The recent rains have added considerably to the supply in the old reservoirs and no water famine is predicted. At the same time that the Council is carrying on the work on the Leonard's Springs extension, they are receiving propositions from capitalists who propose to go to White River at Gosport, sixteen miles north of here, and sink driven wells for a permanent supply of water. No action will be taken until all the propositions have been received and until the Public Service Commission makes its recommendations. Several Indianapolis, Chicago and Milwaukee capitalists have engineers here making estimates, which will be submitted soon.

Famines Follow Water Waste.

Joliet, Ill.—Not a drop of rain has fallen here in the last three weeks and the city faces the most serious water famine in many years. The city water department is pumping a supply that barely equals the demand. A serious fire in the business district would exhaust the emergency supply in less than half an hour. The water department is preparing to make connection with Hickory Creek if the drought continues.

Maryville, Mo.—Manager L. A. Denny of the city water company cautions the people of Maryville against the waste of water. There is no danger of the supply giving out, he says, but the waste of water should be kept down. The reservoir is full of water and is being kept full, but in the last few days the river has gone down. In one day the pumps took it down nearly two feet. Mr. Denny asked that the sprinkling of the streets and lawns be stopped.

Anderson, Ind.—Superintendent Drach of the municipal water plant has announced that the curfew would sound in cases of fires to warn patrons from sprinkling lawns while fire pressure is on. He stated that the city is at present using almost 4,000,000 gallons of water per day, which is the record.

Waukegan, Ill.—The city of Waukegan made a record water consumption one day recently. A total of 6,069,560 gallons was forced through the mains of the city. There are about 17,000 people in the city of Waukegan, and this would mean a per capita consumption of over 356 gallons of water in the day.

Expensive Break in Intake Pipe.

Wheeling, W. Va.—A diver, sent down to examine the 42-inch intake line, has discovered that the big inlet had been broken and had pulled apart about nine inches, throwing all silt in a disturbed river, into the pump chamber of the large Allis Chalmers pump. This discovery came as a very unpleasant surprise to the city officials, as the repair to the big line is expected to add greatly to the expense of an already impoverished city. Water Superintendent Wm. Scroggins stated that he saw no other way than to take the entire pipe up and sink a new section. The break occurred about twenty-five feet from the shore and leaves over two hundred feet of pipe loose in the river. Under the break, for a depth of three or four feet, there is no sand or gravel, as the powerful suction has drawn it all into the pump well. At present the pump is not taking in sand, but should even the slightest raise materialize the turbidity of the water will tend to damage the large pump chambers. The large Allis-Chalmers pump is still at work, but will be closed down should a rise in the river come. The two smaller pumps that have been put in first-class condition will be turned on to take its place and the water supply of the city will not be materially decreased but their operation will cost the city about \$25 per

day more to operate than the 20,000,000 gallon pump. A coffer-dam will probably be necessary and an expense of several thousand dollars can be expected. The intake pipe was lengthened just a few months ago. The exact cause of the break is not known, but the superintendent feels that it was caused by the sinking of the large pipe.

Service Commission Runs Water Company.

Baltimore, Md.—Recognizing the need of drastic action to relieve the water situation in certain sections of Baltimore County, the Public Service Commission has practically taken possession of the Ruxton Water Company's plant and is operating it for the benefit of residents of Ruxton. In making this announcement Osborne I. Yellott, people's counsel before the commission, declared that the commission should have power to take possession of any public utilities corporation which cannot for any reason furnish adequate service to its patrons. In the case of the Ruxton Company the commission took possession with the consent of the company. The water situation at Ruxton, Lutherville, Towson and other places has reached a crisis. On one day the water at Lutherville and Towson failed completely. The Baltimore County Water & Electric Company, which supplies those towns, gave as one excuse for the failure the recent connection of Ruxton with the Baltimore County system. Prior to a few weeks ago the Ruxton Water Company furnished water for residents of that suburb. Following numerous complaints, a hearing was held by the commission, and the residents formulated a plan to have the Baltimore County Company supply Ruxton. This was approved by the commission, and the connection with the Baltimore County system was recently made. Unless the Baltimore County Water & Electric Company furnishes an adequate supply of water to residents of Lutherville immediately the Lutherville Improvement Association may ask that a receiver be appointed for the concern.

Main Out of Joint.

Wilmington, N. C.—With the large 24-inch main under the Seaboard Air Line in the northern part of the city temporarily out of commission and the city receiving its water supply through a 12-inch main for the time being, the pressure on the city water is 20 pounds below normal, which is 60 pounds. The trouble is only temporary and will be repaired within ten days. The big main where it crosses under the deep cut slopes gradually down on one side of the track until it reaches a sufficient depth below the track level. On the other side, instead of sloping upward to the ordinary level, there are a series of 24-inch elbows, whereby the pipe climbs like stairs to the street level. The constant pulsations from the big pump at the water plant, carried through the water in the main, made the trouble at these elbows and kicked some of them off, necessitating shutting off the water in the big main.

STREET LIGHTING AND POWER

Philadelphia Utilities Bureau Chosen.

Philadelphia, Pa.—Mayor Blankenburg's plan for the organization of a National Bureau of Utilities Research has met with such an unexpected response and guarantee of financial and moral support from the principal cities throughout the country that it has been found necessary to provide for a preliminary organization in advance of the meeting proposed in this city in November and men distinguished in professions, law, finance and business in many states have been named upon a board of trustees. This board will prepare for the meeting and outline a plan for merging the cities of the nation in one union to work out their relations with public utility corporations in improving service and obtaining lower rates. After consulting with those who discussed with him the proposed conference, the mayor named the following to membership in the board of trustees:

Louis D. Brandeis, lawyer, Boston, Counsel for Interstate Commerce Commission on application of Eastern Railroads for 5 per cent. increase; Charles R. Van Hise, president, University of Wisconsin, Madison, Wis.; S. S. Fels, manufacturer, Philadelphia; Frederick W. Taylor, consulting engineer, Philadelphia, past president of the American Society of Mechanical Engineers, leader in scientific management movement;

Frederick A. Cleveland, director of the New York Bureau of Municipal Research, formerly chairman of the President's Commission on Economy and Efficiency; Leo S. Howe, professor of political science, University of Pennsylvania, president of the American Academy of Political and Social Science; Charles F. Jenkins, publisher, Philadelphia; Felix Frankfurter, Cambridge, Mass., Professor of Law, Harvard University, chief legal adviser of the Colonial Administration of the United States under Presidents Roosevelt, Taft and Wilson.

There are three members to be named later, and with Mayor Blankenburg will constitute a board of twelve. Mayors of cities who have responded to Mayor Blankenburg have been notified that the tentative dates of November 12, 13 and 14 are suggested for the meeting in this city. Some of the mayors will bring with them electric lighting experts, who will address the convention.

Municipal Plants Show Profits.

Hamilton, O.—City Auditor E. E. Erb denies a statement made by H. J. Condon, of Chicago, at a meeting of the Ohio Electric Light Association at Sandusky, to the effect that the Hamilton municipal gas works in 1913 lost \$46,531. Quoting from the annual report the city auditor shows that during the year 1913 the receipts of the gas plant were \$83,237.39, while the total expense, both ordinary and extraordinary, amounted to \$77,243.48, leaving a balance or profit of \$5,993.91. Receipts of the water department were \$51,555.42, expenses \$33,628.27, balance \$17,425.85. Receipts of the electric department were \$60,537.25, expenses \$46,241.36, balance \$14,295.89. These figures include all expenses of the various plants except interest on the bonded debt and depreciation, which would not amount to anything like the net gain, it is believed. It is interesting to note that in addition to the balance credited to the electric light plant, this sum should be increased by at least \$30,000 as this much money would have to be spent by the city for street lighting, which is now done by the city plant. This is also true of the water department, as public institutions, and city buildings are given free water, and this money is saved the taxpayers. Another thing which must be considered is the fact that the city plants have greatly reduced the cost of gas, water and electricity to the consumer. The price of gas has been cut from \$2 to 30 cents per thousand while big cuts have been made in the price of water and electricity.

City to Build Dam.

Marble Falls, Tex.—Plans for the construction of a municipal dam at Marble Falls are well under way, according to R. E. Johnson, mayor, who is in Austin conferring with some of the state officials relative to some of the details on this question. Mr. Johnson said that it was the intention of the city of Marble Falls to construct a dam across the Colorado river right at the town of Marble Falls, which will supply a sufficient amount of water and power for all municipal purposes.

FIRE AND POLICE

\$126,000 Fire in Brazil, Ind.

Brazil, Ind.—The heart of Brazil's business section was threatened when fire wiped out two buildings and damaged two others with a total loss of \$126,000, partially covered by insurance. One man was arrested because he refused to help fight the fire. A company from Terre Haute responded to the call for aid, making the run of 16 miles on a special train in 11 minutes.

Dynamite Fails to Check Big Fire.

Jasonville, Ind.—Jasonville has turned toward the work of reconstruction, following the fire that laid waste the center of the city. The night following the fire was one of darkness, the only light in the city streets coming from the glow of the smoldering ruins of the four squares that fell before the flames. The business district was practically wiped out, half a score of families were made homeless, one man was killed, and \$300,000 was the loss in a fire that swept through the city. The fire began in a motion picture show. Fanned by a high southwest wind, the flames spread rapidly through the business part, and an hour after the fire started four of the six squares composing the business

district were doomed. The drought and the absence of a water supply made the buildings easy prey for the flames. Dynamiting failed to stay the flames, and the only efficient check to the fire was open ground along the Southeastern railroad tracks. Even there the flames burned away the station and leaped across the tracks and set fire to ten small dwellings. Forty-four buildings, some of them brick and others frame, were among those destroyed in the business district. Several of the buildings were destroyed by dynamite, which was exploded in an effort to check the flames. A man was killed by one of the explosions. Soon after the fire broke out calls for aid were sent to Terre Haute, Brazil, Sullivan and other nearby cities and towns. The only response was from Terre Haute, which city sent a score of firemen and a wagon and other apparatus by special train on the Southeastern railroad.

Proposed High Pressure System.

Duluth, Minn.—With the filling of the new 5,200,000-gallon reservoir of the middle system, the city has available the key for a high pressure water supply to furnish better fire protection to the downtown district. Since the completion of the big reservoir Commissioner William A. Hicken, head of the safety division, has been giving the high pressure system considerable study. He states that extra heavy pipe would be required to withstand the pressure, estimated at 240 pounds per square inch, and that special 3-inch hose with special 2-inch nozzles and special hydrants would be necessary. The system would add greatly to the efficiency of the department, enabling it to combat successfully any conflagration in the biggest downtown buildings, according to Commissioner Hicken. The safety commissioner has had some rough preliminary estimates of the cost prepared. The figures show that the expense would run from \$40,000 to \$50,000. The present mains would not be able to withstand the pressure, but new mains could be laid with service connections or a "dry" system could be built. The water would be turned into the latter only in case of a big fire within the territory covered by the high pressure mains. These could be laid close to the surface of the ground as they would not have to be protected from frost because they would be drained through "bleeders" as soon as the department was through using them. Commissioner Hicken proposes to consult the underwriters to learn if the installation of such a system would result in a sufficient reduction in insurance rates to warrant the expenditure. The city would pay the water and light department a hydrant rental equal to about 8 per cent of the cost. The new reservoir is circular in shape, resembling a huge tank. It was built by D. H. Clough & Co. and cost \$45,000.

MOTOR VEHICLES

Fire Truck a Money-Saver.

Hillsboro, Tex.—This city has issued interesting statistics showing the saving effected by a motor fire truck. For the year ending July 1, 1914, the total expense of Hillsboro's fire department was \$1,938.75. For the previous year it was \$2,737.87. Fire Chief Ed Rowan attributed the saving of \$799.12 to the purchase of a motor apparatus. This motor truck had not been in use a year when the statistics were compiled.

Asheville, N. C. Orders New Truck.

Asheville, N. C.—Members of the Aldermanic Board have authorized fire committee to purchase a new motor propelled hook and ladder wagon. The need for the new machine has been felt for some time past and the order was given only after bids had been secured from many manufacturers, the contract finally being awarded to the Seagrave Company of Cleveland, O., which furnished the motor vehicles now in use. The Asheville fire department discarded horse-drawn vehicles about three years ago, this being the first city in the state to install automobile trucks in the fire department. The new machine will be 80-horsepower and will be modern in every respect.

Salem Buys Apparatus After Fire.

Salem, Mass.—Salem, among many other lessons learnt from its fire, learned the value of motor apparatus. It had a great opportunity to observe all the different types of apparatus at work as fire departments all over New England responded generously to its call. Among the many engines was the one from Chelsea, a Robinson pump, made by the Robinson Fire Apparatus Co., St. Louis, Mo. The Salem department realized the need of motor apparatus during the fire and immediately after, without red tape, decided to buy one. They awarded a contract for the immediate delivery of a pumping engine to the Robinson firm.

GOVERNMENT AND FINANCE

Postpone City Managers' Conference.

Springfield, O.—After somewhat extensive correspondence with the different city managers all over the country, City Manager Charles E. Ashburner finds that many of them would not be able to leave their work during August. He therefore considers it advisable to postpone the city managers' convention, which was to have been held in Springfield on August 4, 5 and 6, until some later date—perhaps during the second half of November.

Athens, Ga., in Line for Commission.

Atlanta, Ga.—A bill establishing a commission form of government for the city of Athens has been passed by the house of representatives. It came to the house from the senate, where it passed, and is now ready for the governor's approval to make it a law.

Recall Election Fails.

Centralia, Wash.—A recall election in Centralia resulted in Mayor H. W. Thompson and Commissioner W. B. Keir and Albert Sears remaining in office, the efforts to remove them having failed. Commissioner Sears came through with a majority of 270; Mayor Thompson with 83, and Commissioner Keir with a bare margin of 6. Only 1,457 votes were cast out of a total registration of 2,514. The charges against the commission included allowing the existence of a disreputable place within the city limits; permitting the sale of liquor therein; allowing a certain local saloon to operate without observing the state law; entering into contract with a Portland cement firm for which Commissioner Sears was the local agent; allowing the city to remain beyond the legal limit of indebtedness, and selling drinking water known to be impure. With the exception of the cement contract, the commission at no time took the trouble to deny any of the charges, the campaign being conducted by the Anti-Recall League, an organization of local business men. The commissioners were elected in December, 1911, and their terms of office do not expire until December of next year. As a result of the election the commissioners will be allowed to complete their terms of office without any further danger of recall.

RAPID TRANSIT

Start Work on San Francisco's New Street Railway.

San Francisco, Cal.—The construction of the Municipal Railway on Stockton street has been begun by the contractor, F. Rolandi. The first shipment of cars by the Jewett Car Company of Newark, O., for the new Municipal Railway will be delivered shortly. The contract calls for the first delivery of 25 cars on August 14th, and 25 are to be delivered thereafter every 30 days. A bonus is allowed for earlier delivery. The number of cars ordered is 125.

City Wants Faster Trains.

McKeesport, Pa.—This has a novel complaint. There was at one time an ordinance passed there that trains while passing through the town must limit their speed to 8 miles per hour. Now, however, the sentiment has changed and the citizens are asking for a repeal of the ordinance on the grounds that the trains obstruct traffic by going at such a slow pace through the town. McKeesport is evidently "promoting progress."

Starts on New Terminal.

Pittsburgh, Pa.—Work has been started on the new Corliss Street Tunnel which is to give Sheridan an eight minutes' shorter route to the city. The cost of the tunnel at completion will be about \$190,000. The height of the tunnel will vary from 21 to 25 feet, while its width will be about 42 feet. Double street car tracks will run through it. The tunnel proper will be 475 feet long. Ornamental portals will be erected at the north end and the inside of the structure will be well lighted. N. S. Sprague, chief of the city bureau of engineering, has general supervision of the construction of the tunnel.

MISCELLANEOUS

Billboards and Signboards.

Peeksville, N. Y.—Edward S. Cornell, secretary of the National Highways Protective Society, with a corps of men are at work taking down advertising signs along the highways as authorized by Chapter 316 of the Laws of the State of New York, 1911. Working under this law, Mr. Cornell and his men have already taken down fully a thousand of such signs and they are still busy at it. They are working their way up the state along the New York and Albany post road and making trips inland along all of its important branches. Not only are they taking down signs already up, but they are trying to convince big firms that this method of advertising is a poor one and so preventing the erection of new signs.

Denver, Colo.—A billboard fight has been started by Commissioner of Property Thum. He declared his intention of issuing warrants for heads of the billboard concerns and for property owners who allow billboards to be erected on their lots. He says in a great many cases the laws have been violated flagrantly. Thum also said he may ask the council to repeal the billboard law, which would mean the abolishment of billboards. That, however, will be decided, he said, after the campaign is ended. He declared the offenders had been given many notices to comply with the law, but had ignored them.

Municipal "Movies" Great Success.

St. Louis, Mo.—Park Commissioner Dwight F. Davis has converted Columbus Square—a sunken city block—into a free moving picture theater, poured into it ten thousand children of many nationalities and taught them more about their adopted city, state and nation than they could have learned otherwise in months, he says. Scenes of St. Louis, the New York Zoo, the industries of America, instructive and entertaining pictures were shown free to the residents of the district. Four blocks away a free municipal band concert competed with the moving picture show for the popularity prize, but less than two thousand attended the concert. The only reason more persons did not see the free "movies" was the lack of more standing space. The park commissioner is now busy answering the several scores of inquiries from other cities as to the success of the municipal moving picture shows. To all of them he replies: "The youngsters declare it is the biggest thing that ever happened in St. Louis." The performance with new reels will be given every night the rest of the summer in other sections of the city for an eight-week season. The performances were made possible by \$2,000 appropriated by the municipal assembly.

Plan for a Greater Jersey City.

Jersey City, N. J.—Bion J. Arnold, of Chicago, has been retained by the Executive Finance Committee of the Jersey City Chamber of Commerce as consulting engineer for the projected improvements in the city's commercial and industrial facilities. The principal work will be to develop port facilities, including the construction of docks and planning a connecting railroad to unite all the railroads and connect them with the docks and factory sites in the flats. Other work is planned by the chamber, but the question of improving the docks and connecting them with the railroads is the main question. Mr. Arnold is at present working on a central terminal in Chicago, and is on his way to Europe. While in Europe Mr. Arnold

will confer with F. Van Z. Lane, who is now abroad with another party studying municipal conditions, and who will act as resident engineer in charge of the work which the chamber is projecting.

City to War on Blackbirds.

Topeka, Kan.—Chief of Police Ross is going to conduct the annual war on blackbirds. The citizens are making their annual complaint of the bird pest who disturbs morning sleep. Permission has been granted for the use of firearms by Chief Ross for fighting purposes.

Telluride, Colo., Partly Wrecked by Cloudburst.

Telluride, Colo.—Two persons were drowned, fifty families were rendered homeless, and fifteen business blocks, including 100 buildings, were partially wrecked when a wall of water ten feet high, originating from a cloudburst through Cornet Canyon broke through the dam and flooded the town. The damage is estimated at \$150,000. Several hundred residents encamped in public buildings. The town remained partially inundated, but there was no danger of a further rise.

Providence's New Piers Almost Completed.

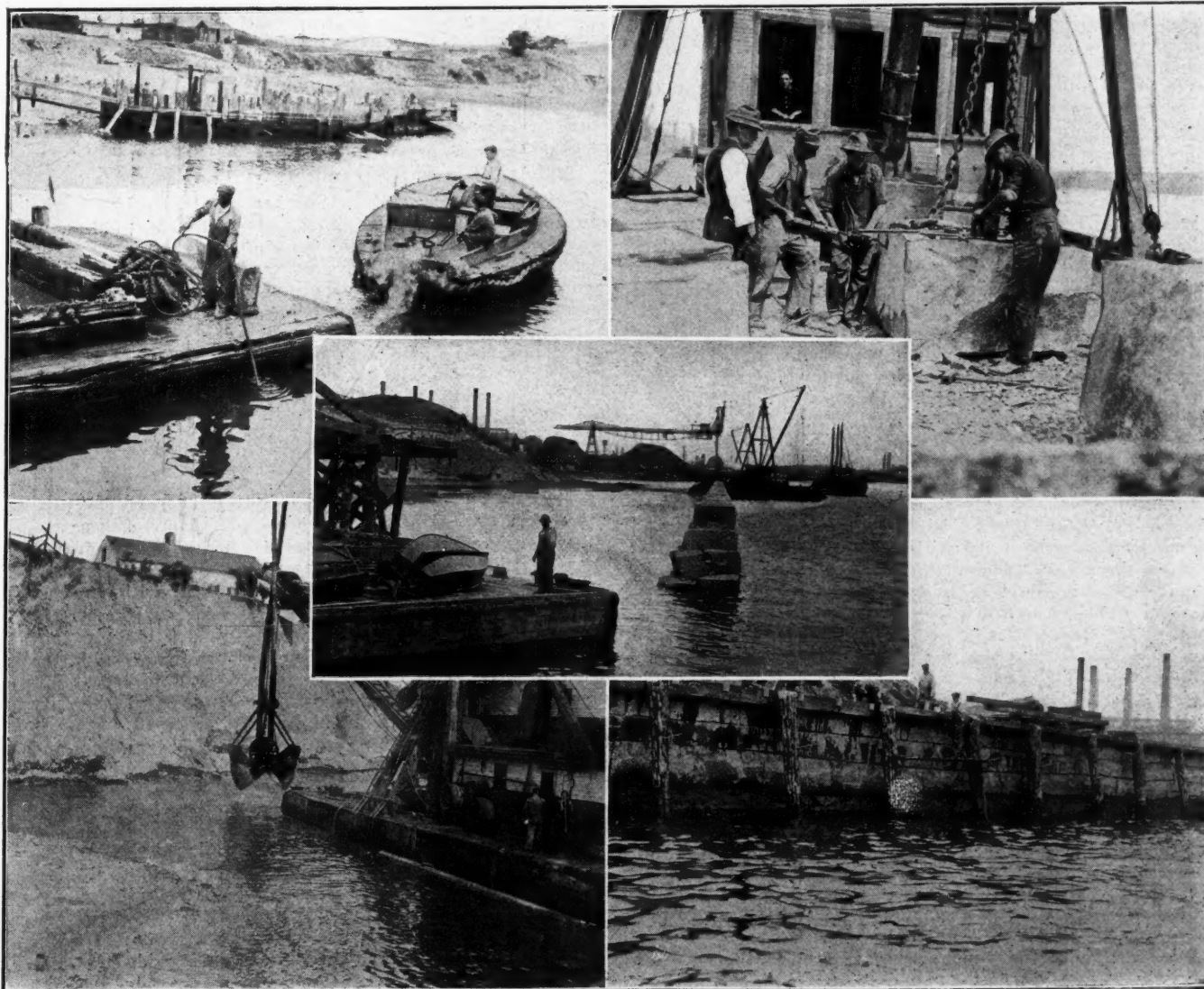
Providence, R. I.—With the exception of one short gap left for the passage of the sludge scow from the city's sewage disposal plant, the new dock at Field's Point, started two years ago, is completed. When this gap is filled Providence will have a docking place 3,000 feet long with 25 feet of water at low tide. In time it is planned to have tracks, sheds and travelling cranes for freight hand-

ling. Under the direction of William D. Bullock, the engineer in charge, test borings were made all along the line of the wall and the foundations made then in two places where the bottom was soft. One of these places was scooped out until a hard stratum was reached. The other had 12 to 30-foot piles driven in thickly at least four feet below the river bottom and the top was filled in with heavy gravel. The width of the wall at the bottom is 24 feet. The first course of stone—or headers—weighed from 5 to 20 tons. By a system of individual plats the engineers have recorded the location and size of each stone.

The top courses have been cemented in order to give an even surface on top and a finished appearance to the sides. The wall tapers from 24 feet at the bottom to 4 feet 4 inches at the top. The interstices in the lower courses have been filled in by coarse gravel dug from the shore, being dumped from scows against the wall bottom. The harbor will end near the middle of the wall and near the sludge wharf. This wharf will be torn down and a trestle so built that the sludge scow may be loaded on the outside of the wall. This trestle will have an electric crane hoist, its cars running on a trolley and dumping mechanically.

For the facing the wall piles, all over 47 feet long, and heavy timbers have been used. The piles, of strong oak, are 10 feet apart and between them are fitted yellow pine joists a foot square.

A fact rather remarkable in such construction work is that the dock was completed in exactly the time estimated.



Courtesy, Providence (R. I.) Sunday Journal.

CONSTRUCTION SCENES OF PROVIDENCE'S NEW GRANITE PIER.

Towboat and Gravel Scow Filling Inside the Wall.

Dressing an 8-Ton Block for Top Layer.

The Gap Still to be Filled in.

Clamshell Bucket Dredging Old Field's Point.

Face of Part of the Finished Wall.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Meander Line of River—Value of Land—Reasonable Market Value.

Hubbell et al. v. City of Des Moines.—In proceedings to condemn land bordering on a navigable stream, evidence of the government surveyor's field notes showing the meander line of the river in the vicinity of the land in question was inadmissible; meander lines not being considered legal boundaries. In proceedings to condemn land, an instruction that the term "reasonable market value" means the fair and reasonable value of the property at the time in question, and may be determined from evidence of facts which the owner will properly and necessarily press on the attention of a buyer with whom he is negotiating a sale, and which would naturally influence or deter a person of ordinary prudence desiring to purchase, the jury being entitled to consider evidence of facts then existing, and which enter into the value of the premises in public and general estimation, and which may tend to influence the minds of sellers and buyers in determining the reasonable value of the property at the time, is proper.—Supreme Court of Iowa, 147 N. W. R., 908.

Common Council—Election Contest.

Sinclair v. Common Council of City of Grand Rapids.—Under Grand Rapids Charter, providing that the common council is the judge of the election and qualification of its own members and shall decide upon and determine contested elections of its own members, the determination of the council, as in case of superior legislative bodies, is final and cannot be questioned by the courts.—Supreme Court of Michigan, 147 N. W. R., 942.

Defective Street—Action for Injury—Sufficiency.

Meagen v. Town of Gary.—Under Laws 1897, c. 90, requiring, within 60 days after an injury from a defective street, notice to be given to the town clerk of the time, place, and cause of the injury, etc., a letter from plaintiff's attorney to the town clerk, demanding a settlement, and in a general way calling the clerk's attention to the time, place, and cause of the accident, was sufficient; the only purpose of the act being to apprise the town or city of the fact that an accident, for which damages will be claimed, has occurred, so that an investigation may be made.—Supreme Court of South Dakota, 147 N. W. R., 965.

Torts—Notice of Claim of Injury.

Jorguson et ux. v. City of Seattle.—Under Seattle City Charter, art. 4, sec. 29, requiring the filing of all claims for damages against the city within 30 days after the claim accrued, the filing of such claim was necessary to the maintenance of an action for damages caused by the sliding of the soil of lots resulting from a change in the grade of a street. The only restraint of a city's power to require notice of claims for damages is that the requirement be reasonable, and not infringe the constitutional guaranty of due process of law.—Supreme Court of Washington, 141 P. R., 334.

Resolution Removing Officer—Sufficiency.

Mullane v. City of South Amboy.—A resolution of a city council convicting the overseer of the poor of misconduct and incompetency in office was fatally defective because not reciting the substance of the evidence upon which the conviction rested.—Court of Errors and Appeals of New Jersey, 90 A. R., 1030.

Injury to Employee—Liability.

Riley v. City of Independence.—A city operating an electric light plant assumes the same responsibilities to its employees injured therein as private persons and private corporations running similar plants. In an action for injuries to an employee in a municipal electric light plant caused by an electric shock, evidence held to make a question for the jury as to whether a switch was negligently constructed

and maintained, and whether the accident was due to such negligence.—Supreme Court of Missouri, Division No. 1, 167 S. W. R., 1022.

Charter—Construction.

San Charstina Inv. Co. v. City and County of San Francisco.—The provision of San Francisco charter that the taxes should not exceed a certain rate, except in case of great necessity or emergency, when the limitation might be suspended, but that no increase should be valid unless authorized by ordinance passed by the unanimous vote of the supervisors and approved by the mayor, does not require a unanimous vote of all of the supervisors elected, and it is sufficient that all present vote in favor of a suspension of the limitation, for other sections of the charter showed that apt language was used when it was desired to distinguish between the supervisors present and the entire number.—Supreme Court of California, 141 P. R., 384.

Defective Streets—Liability.

City of Bessemer v. Whaley.—The failure of a municipality to exercise its charter powers to abate nuisances does not give one injured thereby a private action; but when a nuisance is a defect in a street, rendering it unsafe for travel in the ordinary modes, the municipality is liable to a traveler injured by the defect. A municipal corporation need only use proper care to see that its streets and sidewalks are reasonably safe for persons exercising ordinary care and prudence, and is under no obligation to provide against everything that may happen, and need not so maintain its streets and sidewalks as to secure absolute immunity from danger in using them. A city which has for a long time permitted on a sidewalk the daily and habitual accumulation of fruit peelings, banana peelings, decayed vegetable matter, and other loose substances, to the danger of pedestrians using the sidewalk, is liable to a pedestrian injured thereby while in the exercise of due care.—Supreme Court of Alabama, 65 S. R., 542.

Special Assessments—Enforcements—Unenforceable Assessments.

City of Decatur et al. v. Southern Ry. Co.—Under the statute providing for special assessments for public improvements and their collection by proceedings in rem, a municipal corporation cannot recover a personal judgment against a property owner for the amount of the assessment; the statutory proceeding in rem being exclusive. A special assessment levied upon a railroad right of way under a statute which authorized its collection only by a proceeding in rem, which could not be enforced against a railroad company by sale of its property, is unenforceable and amounts to nothing more than a cloud upon the railroad company's title.—Supreme Court of Alabama, 65 S. R., 536.

Public Improvements—Advancing Money—Interest.

Merchants' Loan & Trust Co. v. City of Chicago.—Where a municipality required abutting owners to advance the money for the laying of waterworks in sparsely settled districts and provided for the repayment with interest when the revenue from the mains should reach a certain amount, the provision for payment of interest was not violative of public policy, being in accordance with the usual provisions where money is borrowed for local improvements, and having been acted upon by the city officials for many years, for the public policy of a state is found in its Constitution, statutes, judicial decisions, and the constant practice of governmental officials.—Supreme Court of Illinois, 105 N. E. R. 727.

Public Improvements—Property Benefited.

City of Kankakee v. Illinois Central Railroad Co.—Where railroad tracks were upon an embankment 2½ to 16 feet above the surface of a street upon which the right of way abutted, the portion of the right of way between the embankment and the street was from one to two feet lower than the street grade, and the only drain provided for in a proposed improvement of the street was a tile five feet from the curb line and two feet beneath the pavement, no benefits could be assessed against the right of way on the theory that the improvement would facilitate the drainage of the right of way.—Supreme Court of Illinois, 105 N. E. R. 734.

NEWS OF THE SOCIETIES

Calendar of Meetings.

Aug. 5-7.
COUNTY COMMISSIONERS OF PENNSYLVANIA.—Annual Convention, Erie, Pa. T. W. Waterhouse, Chairman Local Committee.

Aug. 5-7.
UNION OF CANADIAN MUNICIPALITIES.—Fourteenth Annual Convention, Sherbrooke, Que. Sec.-Treas., W. D. Lighthall, Montreal.

Aug. 10-12.
MONTANA GOOD ROADS CONGRESS.—5th Annual Convention, Great Falls, Mont. Secretary, Walter S. Clark, Great Falls.

Aug. 10-13.
MASSACHUSETTS STATE PERMANENT FIREMEN'S ASSOCIATION.—Annual Convention, Lynn, Mass.

Aug. 18, 19, 20.
FIREMEN'S ASSOCIATION OF THE STATE OF NEW YORK.—Geneva, N. Y.

Sept. 1.
PACIFIC COAST ASSOCIATION OF FIRE CHIEFS.—Annual Meeting, Vancouver, B. C. Exhibition of apparatus, August 28, San Francisco.

Sept. 2-4.
NATIONAL ELECTRIC LIGHT ASSOCIATION. New England Section. Annual Convention, Narragansett Pier, R. I. Chairman Entertainment Committee, E. A. Barrows.

Sept. 9, 10, 11.
NATIONAL PAVING BRICK MANUFACTURERS' ASSOCIATION.—Eleventh Annual Convention, Buffalo, N. Y. D. H. MacDonald, Assistant Secretary.

Sept. 9-11.
NEW ENGLAND WATER WORKS ASSOCIATION.—Annual Convention, Boston, Mass. Secretary, Willard Kent, Narragansett Pier, R. I.

Sept. 15-18.
INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS.—Annual Convention, Atlantic City, N. J. Secretary, C. W. Pyke, Electrical Bureau, Philadelphia, Pa.

Sept. 21-25.
ILLUMINATING ENGINEERING SOCIETY.—Eight Annual Convention, Cleveland, Ohio. Assistant Secretary, Joseph Langan, 29 West 39th street, New York City.

Oct. 6-9.
AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS.—Annual Convention, Boston, Mass. Secretary, Charles Carroll Brown, Indianapolis, Ind.

Oct. 20-23.
INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS.—Annual Convention, Grunewald Hotel, New Orleans, La. Secretary, Mr. McFall, Roanoke, Va.

Oct. 21-23.
ALABAMA GOOD ROADS ASSOCIATION.—Nineteenth Annual Convention, Montgomery, Ala. Secretary, J. A. Rountree, 1021 Brown Marx Bldg., Birmingham, Ala.

Oct. 28-31.
NORTHWESTERN ROADS CONGRESS.—Milwaukee, Wis. Secretary, J. P. Keenan, Milwaukee.

Nov. 9-13.
AMERICAN HIGHWAY ASSOCIATION.—Fourth American Road Congress, Atlanta, Ga. Secretary, J. S. Pennypacker, Colorado Building, Washington, D. C.

Nov. 18-20.
WASHINGTON STATE GOOD ROADS ASSOCIATION.—Spokane, Wash. Secretary, M. D. Leche, Alaska Building, Seattle, Wash.

Dec. 14-17.
AMERICAN ROAD BUILDERS' ASSOCIATION.—11th Annual Convention; 5th Annual Good Roads Congress, and 6th Annual Exhibition of Machinery and Materials, International Amphitheatre, Chicago, Ill. Secretary, E. L. Powers, 150 Nassau st., New York, N. Y.

Feb. 10-17, 1915.
EIGHTH CHICAGO CEMENT SHOW.—Coliseum, Chicago, Ill. Cement Products Exhibition Co., J. P. Beck, General Manager, 208 S. La Salle Street, Chicago, Ill.

National Paving Brick Manufacturers' Association.

The eleventh annual meeting of the National Paving Brick Manufacturers' Association will be held at Buffalo, New York, Statler Hotel, September 9, 10 and 11. On September 9 will be held the business meeting of the Association. September 10 and 11 will be given over to "A Study of Brick Pavement Construction for Country Highways." This study will engage

the attention not only of the members of the Association, but a large number of engineers and road builders to whom the Association will extend an invitation to take part in the program.

The trip on the 10th will include city inspection as well as country highways. The trip on the 11th will be in the direction of Niagara Falls, and an opportunity will be afforded aside from road construction to see the celebrated wonder and at least one power station that draws its force from that remarkable river.

Last year's annual meeting was a departure from the indoor paper discussion of construction methods. It proved interesting and profitable to all. The Association believes that with its previous experience, this year's effort will greatly surpass that of last year.

The active local men specially interested, Mr. Wm. M. Acheson, Division Engineer of the New York Highway Department; Col. Chas. E. P. Babcock, Engineer of the City of Buffalo; Mr. Geo. C. Diehl, the County Engineer, and also the Chamber of Commerce of the City of Buffalo and their working organizations are doing all in their power to make the occasion an engineering outing both beneficial and interesting.

Florida State Good Roads Association.

A feature of the meeting of the Florida State Good Roads Association at Atlantic Beach, Fla., was the resignation of Captain W. J. Hillman as president of the organization. F. O. Miller, of Jacksonville, Fla., was elected to fill his unexpired term. Mr. Miller has long been recognized as one of the leaders of the good roads movement in Florida.

Among the speakers at the morning session were F. A. Wood, W. E. Parmenter, B. B. Tatum, W. W. Knott, W. R. Carter, Moses Folson and President Priest of the Palatka Board of Trade. H. B. Phillips, of Jacksonville, C. A. Hardee, of Live Oak, and C. H. Freas, of Brookville were appointed as a committee of three for the purpose of drafting a bill creating a state roads department. This bill promises to be a big step in the progress and advancement of good roads improvement in Florida, placing this important subject in a regularly recognized state department of its own. The bill, as soon as drawn up, will be presented to the people by means of the newspapers.

The meeting was brought to an entertaining close when C. E. Foot, of New York, gave an address on modern road construction, illustrating it with many pictures of recently constructed highways in New York and New England. In his lecture, Mr. Foot gave special attention to the building of high-class asphalt roads and explained the advantages of such a construction.

Wisconsin League of Municipalities.

About 200 city officials gathered in Madison for the two-day convention of League on July 21st.

At the afternoon session of the first day, Mayor Joseph Fisher, of Marinette, president of the league, presided, and Prof. Ford McGregor of the state university served as secretary. Col. Duncan MacGregor, private secretary to Governor McGovern, welcomed the guests on behalf of the state. Mayor A. H. Kayser, of Madison, welcomed them for the city and Attorney M. B. Olbrich, of Madison, on behalf of the citizens. Mayor O. J. Sorenson, of La Crosse, responded for the delegates.

In his annual address Mayor Fisher of Marinette advocated a change in the system of city representation on county boards and the adoption of some desirable method of keeping mayors of cities posted on bills pending before the legislature.

At the evening session Commissioner of Public Works Fred G. Simmons, of Milwaukee, spoke on "Asphalt Paving." His talk was accompanied by motion pictures on the subject.

On July 22 W. G. Bruce, of Milwaukee, spoke on "The Commercial Organization and the City Government," while Mr. Frederick C. Morehouse, also of Milwaukee, spoke on a similar subject, "City Organization and City Government."

New England Water Works Association.

The June outing of the association was held in Worcester, Mass., on June 24th. At the town of Holden, the new reservoirs of the Worcester water supply were inspected. An inspection was also made of the city water works shops.

Ohio Electric Light Association.

Municipal ownership was condemned as un-American and impracticable by H. J. Gonden, of Chicago, delivering the principal address of the Ohio Electric Light Association's annual convention here this afternoon. M. E. Turner, of Cleveland, and J. H. Mitchell, of Columbus, were the other speakers. The former advocated improved power service and the latter discussed the progress that has been made in the manufacture of electric vehicles.

Central States Water Association.

The annual convention of the Central States Water Association will be held at Wheeling, West Virginia, August 25 and 26. The entertainment committee of the Wheeling Board of Trade have arranged for the reception of the delegates.

United States Good Roads Association.

According to Secretary J. A. Rountree, the meeting place for the annual convention of the association will be Tulsa, Okla. From information received, it appears to be agreeable to members to meet after November 1st, the exact date to be determined upon by the people of Tulsa.

NEW APPLIANCES

SPEEDWELL MOTOR TRUCKS.

Two, Four and Six-Ton Models for All Hauling Purposes—Motor Under Seat, Accessibility and Distribution of Load Principal Features.

Speedwell Motor Trucks are built in three models, alike in general design, but differing in capacity and power. Model "Y" is a two-ton, Model "Z" a four-ton and Model "X" a six-ton truck. There is a tendency on the part of some truck designers to locate the motor under the seat. This design allows of a short wheel base. In the Speedwell Truck which has this feature this short base is thus obtained without sacrificing valuable loading space and without excessive overhang. The main advantage of this type of design is the resulting short turning radius which enables greater ease in handling in awkward traffic and at loading and dumping places. For this truck, which is made by the Speedwell Motor Car Company, Dayton, O., is claimed special accessibility of all mechanical units which saves time in adjustments and makes for quicker hauls, smoother jobs and less repair cost and time loss. The load is distributed so that 30 per cent. of the weight on fully loaded trucks is carried on front wheels, which means a saving of tire expense on rear wheels.

The motor is four-cylinder water-cooled and 40 h. p., giving 12 miles an hour in the four-ton and 10 in the six-ton. The ignition is Speedwell-Eisemann magneto, with automatic spark advance. The motor is cranked on the magneto so that no battery system is required. This eliminates pounding out of motor bearings. Lubrication is by the splash system and cooling by tubular radiator in the four-ton and honeycomb radiator in the six-ton. The standard wheel bases are 115 inches for the four-ton and 139 inches

for the larger truck. The height on both is 41 inches to the platform and the loading space is 12½ feet long by 6½ feet wide in the smaller truck and 15½ feet by 6¾ feet in the six-ton.

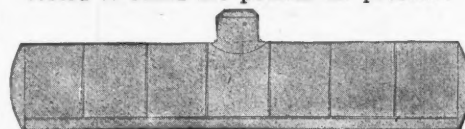
Speedwell bodies are constructed over channel steel members, the floor being of heavy ash timber bolted down and the seams covered with stout metal strips. The motor and transmission are suspended on a pivoted sub-frame which is cushioned by double coil springs. This method of suspension absorbs road shocks and adds greatly to the life of the machine. This is a great saving factor in construction work on bad unimproved roads.

TANKS FOR ROAD OIL.

Used tanks removed from standard railway tank cars may be used for the economical storing of road oil. These tanks, offered by the Universal Iron & Supply Co., 325 Locust street, St. Louis, Mo., are built of boiler plate steel, one-fourth inch thick in the shell and five-sixteenths thick in the dished heads. They have a manhole dome with a 15-inch screwed manhole in its top. The tanks are supplied with capacities from 1,800 to 8,000 gallons and may be equipped with heater coils. These

tanks are located at convenient shipping points in all sections of the country, so that they may be delivered very rapidly and with minimum freight costs.

Universal new pneumatic tanks are tested to stand 125 pounds air pressure



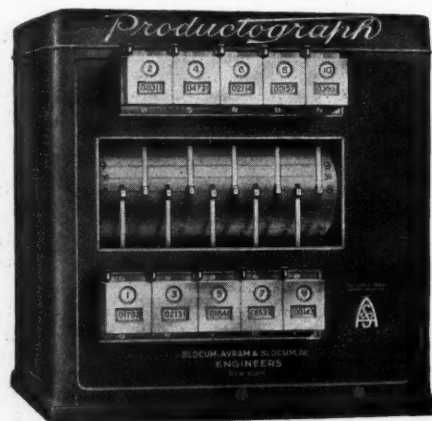
ROAD OIL STORAGE TANK.

and are built in standard capacities of from 120 to 2,500 gallons. New steel storage tanks are made in either upright or horizontal styles and with capacities ranging from 1,000 to 20,000 gallons.

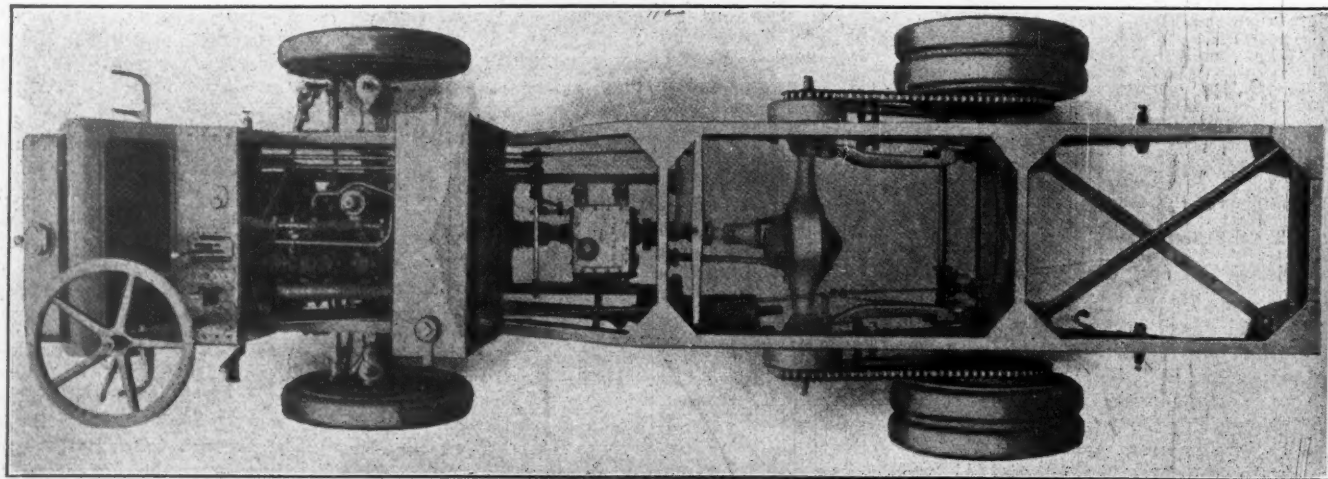
THE PRODUCTOGRAPH.

A Machine Efficiency Recorder for Continuously Recording the Operating Condition of a Number of Machines.

Modern efficiency methods demand a centralized knowledge and accurate detailed record of many simultaneous operations. The "Productograph" is a recording machine made by Slocum, Avram and Slocum, Inc., 87 Nassau Street, New York City, for giving a continuous record of whether a machine or piece of apparatus is working, the time it commenced, when it stopped and how often and how long. The record is made on a recorder chart on a drum, the chart being divided into five-minute spaces. As a machine begins to work the pin makes a mark on the chart in the space corresponding to the machine. This marking is so arranged that the rate of working can be seen at a glance. The Productograph is made in three regular sizes—for five machines or less, six to ten machines and eleven to twenty machines.



MACHINE EFFICIENCY RECORDER.



PLAN OF FOUR-TON SPEEDWELL TRUCK CHASSIS.

The possibilities of such a recording device, are, of course, innumerable. It should be of great value in any construction work. A contractor or superintendent could follow a whole job from the office, knowing what crushers, mixers, hoists, shovels or pumps are working, the causes of reduced output and breakdowns. The "Productograph" could be used to striking advantage by a city engineer who has a number of different jobs to follow. A recorder on each job would give a permanent record of everything done so that the engineer could make his rounds more quickly, spend less time in actual superintending and, if necessary, more time in the office.

curb bars are furnished curved to any reasonable radius to meet the requirements of street intersections and come in standard 8, 10 and 12-foot lengths. The cost is claimed to be only about one-half of granite curbing, while the wearing advantages are said to be in favor of the steel. The most important use of the bars is in protecting concrete curbing, but they have a wide use in all types of concrete construction such as exposed corners of pillars (as in entrances of fire stations), bridges, stairs and platforms.

Trus-Con Side Forms are designed to eliminate the evils and expensiveness of wood forms needed at the sides of concrete roads. These forms are

ment. The forms have a double interlocking slide at the ends so as to make them one continuous steel section. Steel stakes easily driven in place hold the forms firmly. The forms are easy to lay and may be moved on quickly to the next location. Trus-Con Side Forms are 6 inches deep and have flanges $1\frac{1}{2}$ inches wide at top and bottom and the standard length is 10 feet.

Both the Trus-Con Side Forms and the Kahn Curb Bars belong to the line of Kahn Building Products made by the Trussed Concrete Steel Co., Youngstown, O.

A SINGLE HOOK CLAM SHELL BUCKET.

For Handling All Materials—Particularly Where Much Miscellaneous Work Is to be Done from One Drum Hoist.

The Brosius Grab Bucket is a single hook clam shell bucket for handling sand, gravel, crushed stone, coal or similar materials. The bucket can do shallow excavating, but is not primarily an excavating bucket and should not be installed particularly for this purpose. It is claimed to be especially valuable to contractors who have a one drum hoist for doing a lot of miscellaneous work and where the material has been handled by dump bucket. In an installation of this kind the bucket can be used at short intervals and do away with the shoveling of

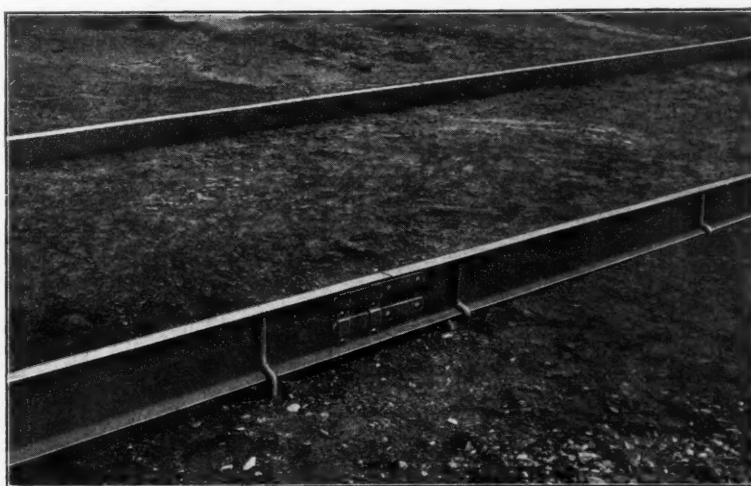


KAHN CURB BAR FOR CONCRETE PROTECTION.
CONCRETE ROAD BUILDING AND PROTECTION.

Kahn Curb Bars for Edge Guarding and Trus-Con Side Forms for Concrete Roadways.

The Kahn Curb Bar is a concrete edge protecting device made from a special steel section punched and expanded into a special design. These bars are made of highest grade open hearth steel heavily galvanized after forming. The steel plate is of ample size to take up all shocks and distribute them throughout the mass of the concrete. The anchors formed from the same section as the plate extend well into the concrete and the positive shoulder affords anchorage independent of the adhesion of the concrete. It is claimed that the open anchorage design of the Kahn Curb Bar does not separate the concrete and eliminates any tendency to split at the corners. The rigidity and convenient size of the bar are calculated to make it easy and cheap to handle and install without special tools and equipment. These

channel-shaped and rigid, and as they are made of steel they may be used many times over and are practically indestructible. The edge remains straight and true and serves as an accurate guide for finishing the pave-



TRUS-CON SIDE FORM FOR CONCRETE ROADWAYS.



THE SPEEDWELL FOUR-TON ON HAULING JOB.

material—thus saving much labor. The particular advantages claimed for this bucket are that it can be easily attached and detached from an overhead traveling crane or hoist; that it is operated by a single hook and tripped by means of a line from the crane cage

sible for the operating height, which is 9 feet, minimum, for the $\frac{3}{4}$ and 1-yard

buckets and 10½ feet, minimum, for the 1½ and 2-yard buckets.

The latch releasing lever works on the roller bearing principle, requiring very little pull of trip line to release. The digging power of the bucket is claimed to be excellent, being the maximum obtainable for the operating height. The 2-yard bucket requires but 9 feet 9 inches headroom for operation, so that the bucket can handle material in and out of a hopper bottom car if the hook has a clean lift of 20 feet above the track.

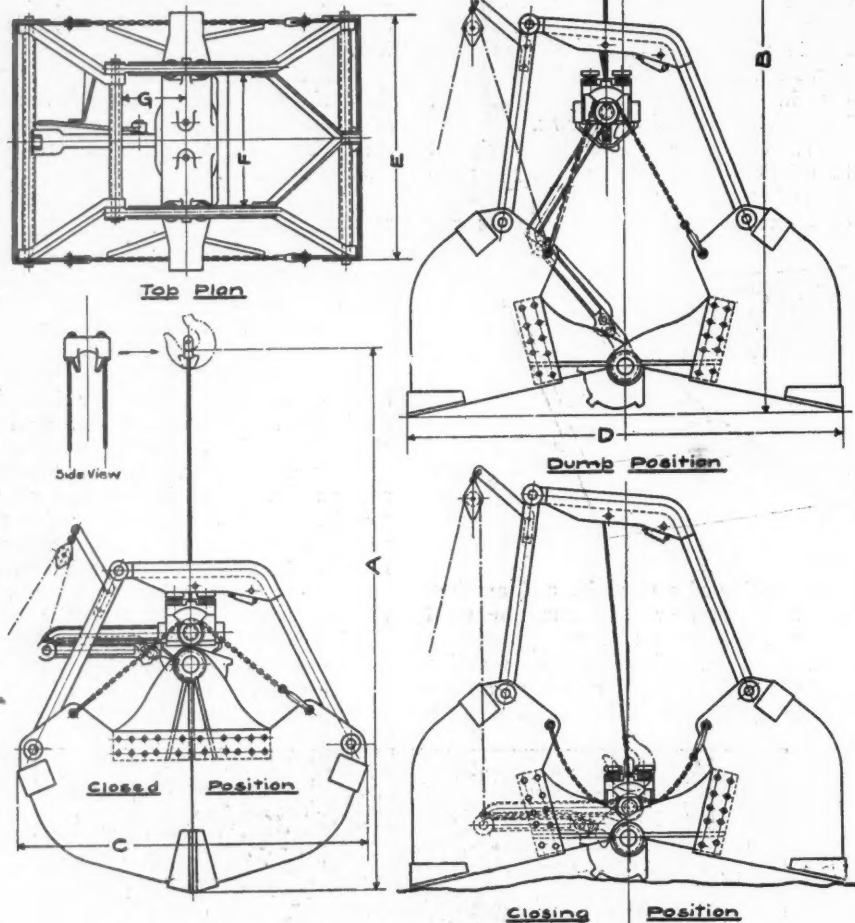
The bucket is built entirely of steel and designed for severe service. The wearing parts are few and generously proportioned. The Brosius bucket, which is made by Edgar E. Brosius, Machesney Building, Pittsburgh, Pa., is also used for handling coal and other materials in power plants.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago.—A 6,500-ton contract at Cincinnati was awarded to the U. S. Cast Iron Pipe & Foundry Co. 600 tons was bought at St. Paul. Contracts are being awarded for 2,500-5,000 tons 8-12 inch at Chicago, 1,800 tons at Columbus, O., and 280 tons at Lincoln, Neb. Quotations: 4-inch, \$26; 6-12-inch, \$24; 16-inch and up, \$23.50. New York—Bids have been taken by Belleville, N. J., for 200 tons. Quotations: 6-inch, \$20.50 to \$21.

Lead.—Quotations: St. Louis, \$3.75; New York, \$3.90.

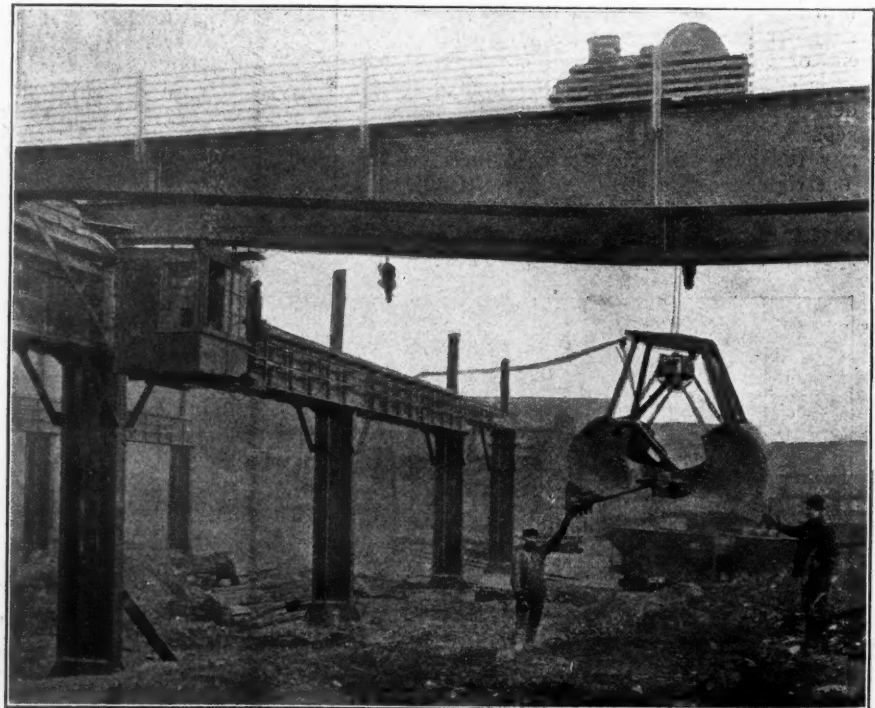
The Terry Steam Turbine Co., Hartford, Conn., has recently received an order for twenty turbines for the new generating station of the Philadelphia Electric Company. They have installed new machine tools, increasing the capacity of their plant twenty-five per cent.



PLANS OF THE BROSIUS BUCKET.

or ground, and that it operates without shock to crane or bucket.

When the bucket is opening there is no shock, this being mechanically absorbed without the use of air cylinders or springs. This is accomplished by two side chains, one on each side, which pass over rollers in the crosshead and are fastened to the side plates. The ends of these chains are attached to the bucket sections at points which are so located that as the bucket drops open they move inward and downward about the axis of the outer shafts, thus exerting a constantly increasing leverage on the bucket sections in a direction tending to restrain the opening movement—this becoming a maximum when the bucket is fully open. The pull of the chains is exerted from the bucket sections to the crosshead, which causes the crosshead to move down about 5 inches relative to the upper arms, which, due to the two to one reduction in the rope for lifting, causes the bucket to climb the hoisting rope about 10 inches. The hoist hook, passing through the bucket in closing, gives the maximum motion of the hook obtainable to close the bucket. This allows of the greatest closing power pos-



THE BROSIUS SINGLE HOOK BUCKET AT WORK.

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Wis.	Burlington	Aug.	8..Paving and making sewer extension.....	City Clk.
N. J.	Hammonton	8 p.m., Aug.	8..19,041 lin. ft. concrete curb, 29,080 sq. ft. conc. sidewalks.....	W. R. Seely, Town Clk.
O.	Tippecanoe City	Noon, Aug.	8..Brick paving.....	S. O. Mitchell, Vil. Clerk.
Ind.	Valparaiso	2 p.m., Aug.	8..Grading and paving.....	A. Blachley, Porter Co. Aud.
Minn.	Nashauk	2 p.m., Aug.	8..Constructing concrete pavement in several streets.....	W. Sumi, Vil. Rec.
O.	Fostoria	Aug.	8..Macadamizing several miles of pavement.....	Township Trustees.
Ind.	Brazil	10.30 a.m., Aug.	8..Stone and gravel road.....	E. A. Staggs, Auditor.
Ind.	Caldwell	Noon, Aug.	8..Grading and paving with brick, 2,900 ft.....	F. W. Dienstbach, Clk.
Ind.	New Castle	7.30 p.m., Aug.	8..Repairing arch on South Pearl St.....	J. A. Griffin, Town Clk.
Tex.	Forney	11 a.m., Aug.	8..Concrete road, 1 3-10 miles.....	J. M. Lewis, Chm. Bd. Supvrs.
La.	Annamosa	6 p.m., Aug.	10..7,000 yds. paving, 4,000 ft. curb and gutter.....	C. H. Fisher, City Clk.
Minn.	St. Paul	10 a.m., Aug.	10..Grading and improving Homer Ave.....	Aug. Hohenstein, Pur. Agt.
Minn.	St. Paul	10 a.m., Aug.	10..Constructing and repairing sidewalks.....	Aug. Hohenstein, Pur. Agt.
Ind.	Kokomo	10 a.m., Aug.	10..Cement sidewalk.....	Ben. Havens, City Clk.
La.	Corydon	Aug.	10..31,000 yds. paving, curbing, etc., brick, asphaltic concrete and concrete considered.....	A. T. Gallagher, City Clk.
Cal.	Sacramento	Aug.	10..Grading and concrete paving, several roads.....	State Hwy. Commission.
N. J.	New Brunswick	8 p.m., Aug.	10..Regulating and paving Sixth St.....	J. J. Curran, St. Comr.
N. Y.	Cortlandt	2 p.m., Aug.	10..Improving road by laying drain pipe, concrete culverts, erecting retaining walls, etc.....	S. A. Mead, Town Clk.
W. Va.	Williamson	8 p.m., Aug.	10..50,000 sq. yds. brick bituminous macadam paving.....	City Official.
N. Y.	New York	11 a.m., Aug.	10..Regulating, curbing, flagging, grading and paving with granite block on concrete.....	M. E. Connolly, Pres. Queens Bd. Co. Comrs.
Ore.	Portland	10 a.m., Aug.	10..Paving with Warrenite.....	J. H. Gainer, Mayor
R. I.	Providence	2.15 p.m., Aug.	10..Paving with sheet asphalt.....	A. Schraeder, Dir. Pub. Ser.
O.	Pequa	noon, Aug.	10..Macadamizing one road.....	F. G. Dessery, City Engr.
Cal.	Covina	Aug.	11..Grading, curbing, guttering and paving.....	City Rec.
Utah	Logan	Aug.	11..85,000 sq. ft. concrete sidewalks and about 4,000 sq. ft. concrete crossings.....	J. E. Kantner, Comptroller
Pa.	Pittsville	10 a.m., Aug.	11..Cement and brick pavement and gutter.....	Bur. Supplies & Accts. Navy Dept.
D. C.	Washington	Aug.	11..50,000 lbs. refined No. 1 Trinidad asphalt, 20,000 lbs. Valde-Travers asphalt & 50,000 lbs. asphalt pav. cement.....	State Hwy. Comm.
Ill.	Springfield	11 a.m., Aug.	11..Constructing conc. rds. in six counties, length about 24,358 ft., to cost about \$39,526.....	W. J. Fries, City Cont.
Wis.	La Crosse	Aug.	11..6,000 sq. yds. asphaltic macadam with concrete curb and gutter.....	City Clerk
O.	Ottawa	Aug.	11..5,851 sq. yds. paving. Alternate bids.....	State Highway Commr.
N. Y.	Albany	Aug.	11..Road improvement in Pendleton.....	J. W. Keen, Chr. Bd. Co. County Commissioners
Fla.	Fernandina	Aug.	12..Clearing & grading. Hire of 5-7-ton steam or gas roller.....	A. Brauns, City Engr.
Wis.	Green Bay	Aug.	12..Grading and asphalt on concrete foundation.....	Vil. Clk.
O.	La Rue	Aug.	12..Paving with vit. brick or asphalt block with approved filler on concrete, also constructing gutters, retaining wall, etc.....	C. L. Eirhardt, Aud.
Ind.	Greencastle	2 p.m., Aug.	12..Three macadam roads.....	P. S. Johnson, Secy.
Ohio	Cincinnati	noon, Aug.	12..Asphalt and granite pavement.....	Simon Gundy, Clk. Council.
Pa.	Verona	7.30 p.m., Aug.	12..25,000 sq. ft. sidewalk.....	Thos. H. Keyes, Dis. Clk.
N. J.	Linden	8 p.m., Aug.	12..Concrete sidewalks, curbs and gutters.....	D. R. Gustafson, Co. Aud.
S. D.	Deadwood	10 a.m., Aug.	12..Grading and constructing road improvements.....	I. H. Braley, City Clk.
Mont.	Terry	8 p.m., Aug.	12..33,000 ft. concrete sidewalk.....	Engr. Randall.
Kan.	McPherson Co.	Aug.	12..Constructing sidewalks.....	J. H. Dean, City Clk.
Neb.	Kearney	Noon, Aug.	13..Road work.....	H. C. Fox, Clk.
Ohio	Youngstown	noon, Aug.	13..Paving Boardman St.....	O. H. Apt, Corp. Clk.
O.	Waldo	noon, Aug.	13..Paving with vit. brick or asphalt block on concrete.....	Dept. Pub. Works
Ind.	Fort Wayne	Aug.	13..Paving several streets.....	Capt. W. E. Hart, Depot Q. M.
Tex.	El Paso	11 a.m., Aug.	13..Constructing rds., walks, gutters & drains at Fort Bliss.....	Cap. W. E. Hunt, Depot Q. M.
Tex.	Ft. Bliss	Aug.	13..Roads, walks, gutters and drains.....	W. Dunwiddie, City Clk.
Wis.	Monroe	Noon, Aug.	13..1,321 ft. combined curb and gutter.....	Whitaker & Washington, Engineers
Tex.	Ft. Stockton	Aug.	13..250 miles of road.....	Fred E. Wesselmann, Pres. Hamilton Co. Comrs.
O.	Cincinnati	Noon, Aug.	14..Grading, 1,800 feet.....	T. J. Miller, Co. Aud.
Ind.	New Albany	10 a.m., Aug.	14..Constructing one county road.....	Board Public Works
Wis.	Reedsburg	7.30 p.m., Aug.	14..Brick pavement on four streets.....	Clayton M. Rath, Dir. Pub. Ser.
Ohio	Defiance	Aug.	14..Improving East Second St.....	H. J. Lawler, Clk. Bd. Comm.
Ohio	Lima	Aug.	14..16,000 yds concrete roadway.....	G. Weeden, Co. Engr.
O.	Cambridge	Aug.	14..Brick road, two miles long.....	F. J. Stinchcomb, Co. Engr.
O.	Paulding	2 p.m., Aug.	14..Grading, draining, culverting, macadamizing, rolling and flooding.....	C. F. Meyers, Co. Aud.
S. D.	Armour	1 p.m., Aug.	14..Grading and improving highways.....	D. S. Cooper, Secy. Bd. Ed.
La.	Burlington	4 p.m., Aug.	14..Grading, sodding and cement steps.....	Chas. A. Murlock, Comr.
O.	Marysville	1 p.m., Aug.	15..Grading and macadamizing 3 1/2 miles of road.....	Chas. E. Russell, Supt. Hwy.
Ill.	Lakeville	8.15 p.m., Aug.	15..Grading, draining hard gravel road.....	H. E. Lutter, Co. Clk.
Tex.	Corpus Christi	10 a.m., Aug.	15..Constructing Corpus Christi causeway.....	A. W. Madden, Co. Auditor.
Ind.	Auburn	10 a.m., Sept.	15..Grading, draining and graveling.....	County Commissioners
O.	Cleveland	10 a.m., Aug.	15..Improving two roads.....	H. A. Snyder, Vil. Clk.
O.	Uhrichsville	Noon, Aug.	15..Grading, draining and curbing.....	Raymond F. Davis, Town Clk.
N. J.	Bloomfield	8 p.m., Aug.	17..Grading and paving.....	G. M. Adair, Street Comr.
N. J.	Perth Amboy	8.30 p.m., Aug.	17..Asphalt block pavement.....	G. E. Harman, Comr.
O.	Napoleon	1 p.m., Aug.	17..Road improvements.....	Comms. Summit County.
O.	Akron	11 a.m., Aug.	17..Grading and draining and paving roads.....	T. V. Skinner, Vil. Clk.
O.	New Lexington	Noon, Aug.	17..Grading with brick and otherwise improving street.....	T. C. Patterson, Co. Aud.
O.	Portsmouth	Noon, Aug.	17..Grading and culverting in two townships.....	W. S. Keller, State Hwy. Engr., Montgomery
Ala.	Eutaw	Aug.	17..Grading, draining & surfacing with chirt.....	

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
O.	New Lexington	Noon, Aug. 17.	Paving one street with brick	T. B. Skinner, Village Clerk
Ariz.	Clifton	Aug. 17.	Constructing three miles of rds. to cost about \$50,000.	Board Supervisors
N. Y.	Albany	1 p.m., Aug. 17.	Constructing and repairing roads in several counties; also furnishing High Carbon Tar	John N. Carlisle, Comr.
N. Y.	Watertown	Aug. 17.	Constructing several streets in Adams, and road between Lowville and Coffey	T. E. Reply, St. Supt. Highway Dept.
N. J.	Elizabeth	2.30 p.m., Aug. 18.	Excavation, paving gutters, sidewalks and sodding	Jacob L. Bauer, Co. Engr.
Ala.	Marion	Aug. 18.	Grading, draining and surfacing with gravel	W. S. Keller, State Hwy. Engr., Montgomery
Ala.	Centerville	Aug. 19.	Grading, draining and surfacing with chirt.	W. S. Keller, State Hwy. Engr., Montgomery
O.	Painesville	Noon, Aug. 20.	Furnishing material & labor for grad., drain. & pav. with brick, with conc. base, rd. in Willoughby Twp.	W. Albert Davis, Secy. County Commissioners
Tex.	Sulphur Springs	Aug. 20.	20,000 ft. concrete curb and paving to cost \$150,000.	A. D. Stivers, City Engr.
O.	Findlay	1 p.m., Aug. 22.	Two stone roads	Jean G. Copeland, Clk.
N. J.	Hackensack	2 p.m., Aug. 24.	Road improvements	Harry A. Stewart, Clk.
Ind.	Fort Wayne	10 a.m., Aug. 24.	Concrete road improvement, 5,000 ft.	Calvin H. Brown, Aud.
N. C.	Mooreville	Aug. 24.	9,000 yds. bituminous paving, concrete base and curb.	Alali Osborne, Engr., Charlotte
Neb.	Auburn	Noon, Aug. 25.	\$3,385 road improvements	Frank E. Black, City Clk.
N. Va.	Wheeling	Aug. 27.	Six miles of road with brick or bituminous	Geo. Stenrod, Co. Engr.
Ind.	Wausaw	10 a.m., Aug. 31.	Gravel road	V. D. Mock, Aud.
Ind.	Newport	10 a.m., Aug. 31.	Gravel road	Roy Slater, Co. Aud.
Ind.	South Bend	11 a.m., Aug. 31.	13,200 ft. gravel road	Clarence Sedgwick, Aud. St. Joseph Co.
W. Va.	Charleston	Sept. 1.	Paving and grading, \$32,500.	G. S. Brown, Engr.
Fla.	Arcadia	2 p.m., Sept. 8.	Improving roads and bridges, \$350,000.	A. L. Durrance, Clk. Court.
W. Va.	Kanawaha Co.	Sept. 15.	Improving five miles roads	F. A. Duodett, Engr.
SEWERAGE				
Wis.	West Allis	Noon, Aug. 8.	Laying sewer pipe in various streets	Bd. Pub. Works.
Wis.	Tomah	12 p.m., Aug. 8.	Sewers in various streets	Comm. Pub. Wks.
la.	Centerville	Aug. 8.	Sewage filters, douching chambers, etc.	M. J. Hall, Engineer
Wis.	Burlington	Aug. 8.	Sewer extension	Board Public Works.
Ill.	Mounds	8 p.m., Aug. 10.	Sewer system, including 18,000 8-in. to 15-in. sewers, septic tank and filter beds	T. J. Hudson, City Clerk
Conn.	Bridgeport	Aug. 10.	Constructing sewers in several streets	Paving & Sewer Comr.
N. J.	Newark	3 p.m., Aug. 10.	Building a drain in West Orange	F. A. Reimer, Co. Engr.
Mich.	Bay City	9 a.m., Aug. 10.	12-inch socket tile sewer	Gust. Hines, Chm. Bd. P. W.
Wis.	Appleton	9 a.m., Aug. 10.	Sewer on Story St.	E. L. Williams, City Clk.
Iowa	Clinton	8 p.m., Aug. 11.	Constructing sewer	F. W. Ledham, City Clk.
Minn.	St. Paul	10 a.m., Aug. 11.	Constructing sewer on Jessamine St.	Aug. Hohenstein, Pur. Agt.
O.	Akron	Noon, Aug. 11.	Sewage treatment plant, including screen & grit chamber, conc. sedimentation tanks, pumps, pump house & well	R. Winthrop Pratt, Cons. Eng., Cleveland
Man.	The Pas	6 p.m., Aug. 11.	Two sewage lift pumps, house meters, construction of sewage lift chamber and oil tank chamber	H. H. Elliott, Secy.
la.	Forest City	Aug. 11.	Open ditches and cement tile	C. K. Nelson, Aud.
Ind.	South Bend	10 a.m., Aug. 11.	Pipe sewer	V. G. Sweeney, Act. Clerk.
N. Y.	Brooklyn	11 a.m., Aug. 12.	1,200 ft. of pipe sewer, and sheeting and bracing	L. H. Pounds, Boro. Pres.
N. J.	Trenton	2.30 p.m., Aug. 12.	Constructing one sewer	F. Thompson, City Clk.
O.	Cleveland	Noon, Aug. 13.	Repairing present site for construction of permanent disposal works. (See Proposal Ad.)	A. R. Callow, Comr. P. & Sup.
O.	Sandusky	Aug. 14.	Constructing one mile ditch	L. A. Schultz, Engr.
la.	Chariton	2 p.m., Aug. 14.	Sewer system consisting of 18 1/2 miles, 8 to 30-inch sewer pipe and four disposal plants	T. J. Gittinger, City Clk.
la.	Burlington	Aug. 15.	2,300 ft. 8 ft. concrete sewer, to cost about \$92,000.	H. D. Vollmer, City Engr.
O.	Kenton	Aug. 15.	4,000 ft. sewer pipe, 12 to 18 inches	C. E. Hutchinson, City Engr.
N. D.	Lidgerwood	6 p.m., Aug. 17.	Sanitary sewer system, septic tank and disposal plant	F. W. Mashek, City Aud.
Wis.	New London	8 p.m., Aug. 18.	Sanitary sewer system	C. J. Thomson, City Clk.
O.	Sandusky	Aug. 18.	4,000 ft. 8 to 18-inch sewer pipe	L. A. Schultz, Surveyor.
Ind.	South Bend	10 a.m., Aug. 18.	Pipe sewer on Yuton Avenue	V. G. Sweeney, Act. Clerk.
Mont.	Billings	Aug. 18.	\$18,000 sewerage work	City Clk.
N. C.	Durham	4 p.m., Aug. 18.	Constructing sewage disposal plant, consisting of Imhoff tank, and laying about one mile of 24-inch pipe	W. J. Brogden, Mayor.
Minn.	Warroad	8 p.m., Aug. 27.	Constructing sewers	Council.
Tex.	San Antonio	4 p.m., Sept. 7.	15,000 ft. 72-inch sanitary sewers	Fred'k Fries, City Clk.
WATER SUPPLY.				
Wis.	West Allis	Noon, Aug. 8.	Laying water mains in one street	Board Public Works
Wis.	Racine	10 a.m., Aug. 8.	30 ft. of cast-iron pipe	P. H. Connelly, Bd. Pub Wks
Wis.	Burlington	Aug. 8.	Water works and paving	Bd. Public Works.
Conn.	Hartford	3 p.m., Aug. 9.	Constructing gravel surface road	C. M. Saville, Chf. Engr.
Minn.	St. Paul	1 p.m., Aug. 10.	194,000 ft. c. i. pipe	Aug. Hohenstein, City Pur. Agt.
Minn.	Fulda	8 p.m., Aug. 10.	Pressure tank and steel tower and tank	A. N. Tirney, Vil. Clk.
Minn.	Minneapolis	2 p.m., Aug. 10.	Digging well	Sund & Dunham, Minneapolis, Minn.
Mass.	Webster	Aug. 10.	About 8,000 ft. 20-in. c-i. pipe and 500 ft. 10, 8 and 6-in.; constructing 1,600,000 capacity, reinforced concrete covered reservoir	Bd. Water Comrs.
Mont.	Great Falls	8 p.m., Aug. 10.	Furn. 1 elec-driv. centrifugal pump, 40,000,000 gal. cap.	W. H. Harrison, City Clk.
Minn.	Virginia	7 p.m., Aug. 10.	1,000,000 gal. reinforced concrete reservoir	J. W. Murphy, Sec. Water & Light Comm.
O.	Delta	Noon, Aug. 10.	Extension water works plant	A. R. Thompson, Village Clk.
Ill.	Rock Island	Aug. 10.	6,000,000-gallon motor-driven centrifugal pump	W. T. Treichler, City Engr.
Pa.	Weatherly	Aug. 10.	50-foot concrete spillway	S. G. Eby, Sec. Water Co.
Ill.	Morrison	2 p.m., Aug. 10.	Water pipe and fittings	L. D. Steiner, Fire & Water Com.
S. C.	Charleston	10 a.m., Aug. 11.	Wrought iron pipe	T. J. Cowie, Paymaster Gen'l.
la.	Knoxville	8 p.m., Aug. 11.	Building and erecting extension to water works system	D. M. Maury, Cons. Engr., Chicago, Ill.
la.	Knoxville	8 p.m., Aug. 11.	Cast-iron pipe and fittings	W. E. Reinhardt, City Clk.
O.	Columbus	Noon, Aug. 11.	Constructing alum plant	S. A. Kinnear, Dir. Pub. Serv.
la.	Estherville	9 a.m., Aug. 11.	Constructing additions to waterworks & electric light plant, consisting of pipe line, steel standpipe, pump motor, etc.; cost about \$60,000.	N. G. Egbert, City Clk.
Pa.	Blairsville	8 p.m., Aug. 11.	Pumping engine	H. R. Wiley, Sec. Town Council
Neb.	Wayne	Aug. 11.	Water mains, hydrants, pumps, etc.	City Clk.
Ohio	Cincinnati	noon, Aug. 12.	Furnishing and delivering sulphate of iron	Parke S. Johnson, Secy.
Ill.	Pekin	10 a.m., Aug. 12.	Steel tank	Alvord & Burdick, Engrs., Hartford Bldg., Chicago
Wis.	West Allis	Aug. 12.	Water mains and hydrants	Board Public Works
Minn.	Pennock	8 p.m., Aug. 12.	Water works system complete	G. C. Haug, Vil. Pres.
O.	Bel Air	Aug. 12.	1,500 ft. of 6-inch pipe	W. A. Schramm, Dir. P. Ser.
N. Y.	Rochester	11 a.m., Aug. 12.	Construction of movable dam and deepening Genesee River	F. X. Pfeifer, Secy.
N. J.	Trenton	2.30 p.m., Aug. 12.	Installing chlorine apparatus at filtration plant	Frank Thompson, City Clk.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Ohio	Youngstown	noon, Aug.	13..Constructing, erecting and delivering four boilers and mechanical stokers	H. C. Fox, Clk.
Minn.	New Ulam	5 p.m., Aug.	13..Drilling 360-ft. well	Wm. Backer, Clk.
Neb.	Palmyra	Aug.	14..Complete water works, to cost \$10,000	Martz Engrg. Co.
Ill.	Aurora	5 p.m., Aug.	14..Drilling and casing deep well	Com. on Supplies.
Neb.	Palmyra	7 p.m., Aug.	14..Water works system	W. E. Vaughan, City Clk.
O.	Sycamore	Noon, Aug.	14..Municipal water and light improvements	O. J. Niebel, Clk. Bd.
Sask.	Prince Albert	1 p.m., Aug.	15..2,500 gals. per min. pump & motor, & 14-in. Venturi meter	J. B. Brown, City Clerk
Ill.	Little York	Aug.	15..Drilling a well	W. H. Brown, VII. Clk.
Sask.	Canora	8 p.m., Aug.	18..Laying c. i. pipe; constructing pump house, steel tank, suction wells, etc.	H. M. Sutherland, Secretary
Ont.	Toronto	noon, Aug.	18..Installation of coal and ash handling apparatus at main pumping station	Mayor H. C. Hocken, Chr. Bd. Control.
Wash.	Tacoma	2 p.m., Aug.	18..Furnishing chloride gas water sterilizing apparatus	Jas. C. Drake, Comr.
Neb.	Dalton	Aug.	27..Constructing water works, cost \$7,200	J. L. Willis, Village Clk.
Tex.	Denison	Noon, Sept.	5..2,000,000-gallon filter plant	A. B. Clemmy, City Engr.
Man.	Winnipeg	Sept	19..84 miles of aqueduct, \$8,729,000	Greater Winnipeg Water Dist.

LIGHTING AND POWER.

N. Y.	Farmingdale	10 a.m., Aug.	8..Power house for state school	F. W. Hooper, Sec. Bd. Trus., 30 Lafayette Av., Bkln., N.Y.
Ill.	Rock Island	2 p.m., Aug.	10..Centrifugal pumping unit	M. T. Rudgren, City Clk.
Mont.	Great Falls	8 p.m., Aug.	10..Electric driven centrifugal pump, 4,000,000 gals. capacity	W. H. Harrison, City Clk.
W. Va.	Benwood	Aug.	11..Street lighting	J. Frank Brannen, City Clk.
Ia.	Estherville	9 a. m., Aug.	11..Extension and improvements electric light plant	J. F. Druar, St. Paul.
S. D.	Sioux Falls	9 a.m., Aug.	11..Installation of street lighting system	W. C. Leyse, City Aud.
Kan.	Larned	1.30 p.m., Aug.	14..Constructing municipal light plant complete	L. D. Burgess, City Clerk

FIRE EQUIPMENT.

N. Y.	New York	10.30 a.m., Aug.	10..Making alterations and repairs to engine company quarters; also installing heaters and boilers	Fire Commissioner.
N. Y.	Lockport	Aug.	10..Purchased new fire apparatus	Common Council.
Mich.	Detroit	2.30 p.m., Aug.	10..Construction of engine house	Geo. J. Finn, Secy.
Ont.	Toronto	Noon, Aug.	11..Motor-driven fire apparatus and hose	Mayor H. C. Hocken
N. Y.	Schenectady	2.30 p.m., Aug.	12..Constructing engine house	G. C. Wartmann, Secy.
N. J.	Bloomfield	8 p.m., Aug.	17..Motor driven combination hook and ladder truck	R. F. Davis, Town Clk.
O.	Steubenville	Aug.	17..Furnishing 1,000 ft. of hose	H. W. Patterson, Dir. P. Saf.
O.	Akron	Aug.	18..Constructing new fire station	Director Public Safety.

BRIDGES.

Ill.	Springfield	Aug.	8..Constructing one bridge in Hillsboro	State Highway Com.
Ind.	Shelbyville	10 a.m., Aug.	8..Four concrete culverts	F. W. Fagel, Co. Aud.
Minn.	Worthington	1 p.m., Aug.	8..Two bridges	B. D. Simpkin, Clk.
O.	Marion	Noon, Aug.	8..Substructure	Marion Co. Comrs.
O.	Coshocton	1 p.m., Aug.	8..Constructing several culverts, bridges and repairing abutments	F. C. McCullough, Co. Aud.
N. J.	Camden	11 a.m., Aug.	10..Constructing bridges	F. W. Gercke, Chm. Bridge Com.
O.	Zanesville	1 p.m., Aug.	10..Increasing height and raising bridge	Fied. C. Werner, Muskingum Co. Clk.
Fla.	Jacksonville	3 p.m., Aug.	10..Reinforced concrete bridge	Geo. M. Powell, Chm. Com. Pub. Wks.
Minn.	St. Paul	10 a.m., Aug.	10..Reinforcing Dale St. bridge	Aug. Hohenstein, Pur. Agt.
Wash.	Seattle	2 p.m., Aug.	10..Constructing three concrete piers for bridge	F. Phelps, Clk. Co. Comrs.
Tex.	Temple	5 p.m., Aug.	10..Fittings for two Alberger turbine pumps	T. W. Stephens, City Secy.
Ill.	Stockton	2 p.m., Aug.	10..Two new bridges	A. F. Dittmar, Town Clk.
Cal.	Oakland	Aug.	10..Concrete bridges	State Highway Com.
Pa.	Pottsville	10 a.m., Aug.	11..Erecting bridge	J. E. Kantner, Co. Compt.
Pa.	Wyoming	Aug.	11..Constructing concrete and reinforced steel bridge	Co. Compt.
Minn.	Shakopee	8 p.m., Aug.	11..Cleaning and painting bridge	A. T. Dell, City Rec.
Pa.	Wilkesbarre	2 p.m., Aug.	11..Constructing one bridge	W. R. Hendershot, Compt.
O.	Youngstown	10 a.m., Aug.	12..Abutments	Frank H. Vogan, Clk. Co. Commissioners
O.	Hamilton	10 a.m., Aug.	12..Concrete steel bridge	W. W. Crawford, Co. Aud., Butler Co.
Kan.	Linsborg	Aug.	12..\$16,000 bridge	J. W. Quinn, Co. Clk., McPherson.
O.	Hamilton	Aug.	12..Constructing concrete steel bridge	Co. Comr.
Md.	Baltimore	Noon, Aug.	13..Building Hanover Street bridge	Wm. L. Marcy, Secy.
Ill.	Galesburg	Noon, Aug.	13..Building four bridges in Knox County	Frank L. Adams, Co. Clk.
Minn.	Minneapolis	11 a.m., Aug.	14..Two bridges, one culvert	A. P. Erickson, Aud.
Minn.	Mankato	10 a.m., Aug.	15..Culvert construction	M. M. Cram, Co. Engr.
Ont.	Toronto	Aug.	15..Concrete or steel viaduct	Board of Control.
N. Y.	New Hartford	Aug.	15..Constructing bridge at Genesee St., 75 ft. long and 90 ft. wide	Arthur O'Brien, Utica, N. Y.
O.	Delaware Co.	Aug.	15..Bridge over Olenatangy River	F. O. Highley, Co. Engr.
Wis.	New London	Aug.	16..Constructing reinforced concrete arch bridge	City Clerk
Mich.	Lansing	Noon, Aug.	17..80 ft. concrete arch bridge	F. P. Rogers, State Hwy. Commissioner
N. J.	N. Brunswick	2.30 p.m., Aug.	17..Steel and reinforced concrete culvert	A. B. Fox, Co. Engr.
Minn.	Mankato	2 p.m., Aug.	17..Four reinforced concrete bridges, —70 ft. long	C. L. Kennedy, Co. Aud.
Tex.	Corpus Christi	Aug.	17..8,500 ft. concrete causeway	Bartlett & Renney, San Antonio, Cons. Engrs.
Pa.	Uniontown	noon, Aug.	17..Bridge with concrete abutments	Co. Road Engr., Fayette Co.
Pa.	Fayette Co.	Noon, Aug.	17..Two concrete abutments	Harry Kissinger, Co. Compt.
Ind.	Fort Wayne	10 a.m., Aug.	18..Construction of concrete arches, repairing and painting of bridges	Calvin H. Brown, Aud.
Wis.	Blaine	2 p.m., Aug.	18..Repairing steel bridge	M. E. Crowther, Town Clk.
Ohio	Toledo	10 a.m., Aug.	21..Constructing five culverts	Chas. A. Sangenbacher, Co. A.
Ohio	Cincinnati	noon, Aug.	21..Bridge over Sycamore Creek	Albert Reinhardt, Clk. Board Comrs.
N. J.	Perth Amboy	2.30 p.m., Aug.	24..Concrete slab bridge	Bd. of Chosen Freeholders.
N. M.	Santa Fe	Aug.	29..Four span steel bridge across Rio Grande	J. A. French, St. Engr.
Wash.	Seattle	Aug.	31..Bridge	County Comrs.
Cal.	Senora	Sept.	7..Concrete bridge	E. E. Newell, Tuolumne Co. Sur.

MISCELLANEOUS.

O.	Alliance	Noon, Aug.	8..Constructing new City Hall, and remodeling central fire station	Dir. Pub. Service.
Ill.	Chicago	11 a.m., Aug.	8..Tank wagons, for use on street	L. E. McCann, Comr. P. Wks.
Del.	Wilmington	Aug.	10..Constructing pipe and timber bulkhead	Major E. N. Johnston, U. S. A.
S. C.	Charleston	Noon, Aug.	10..Constructing cressoted pile wharf	J. H. Dingle, City Engr.
D. C.	Washington	Aug.	11..Supplying worm geared chain blocks, spur-gear chain hoists, plow steel wire, etc.	Bur. Sup. & Accts., Navy Dept.
Tex.	Gonzales	Noon, Aug.	12..Erecting reinforced concrete dam	F. S. Taylor, Engr., Austin.
N. J.	Greenfield	8 p.m., Aug.	17..Collection and removal of garbage and ashes	R. F. Davis, Town Clk.
Ill.	Elgin	10 a.m., Aug.	18..Building state hospital	State Bd. Adm., Springfield.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
D. C.	Washington	Aug. 18	Supplying scoop shovels	Bur. Sup. & Accts., Navy Dept.
Pa.	Philadelphia	11 a.m., Aug. 19	Furnishing 4,660 metal wall lockers	Col. T. Cruse, Dept. Q. M.
Cal.	San Francisco	Aug. 19	12,000 ft.	F. J. Churchill, Sec. Bd. P. W.
Ill.	Chicago	Noon, Aug. 19	894 enameled street name signs	J. F. Neals, Secy.
N. Y.	New York	Noon, Aug. 25	General Construction of county court house	C. J. McCormick, Pres. Richmond
Ill.	Chicago	11 a.m., Aug. 27	Constructing head house, Pier No. 2	E. C. Shankland, Chn. Harbor & Subway Com.
Cal.	San Diego	11 a.m., Aug. 29	Coal hoisting tower	Bur. Yds. & Docks, Wash., D. C.
Pa.	Harrisburg	10 a.m., Sept. 1	Furnishing motor vehicle license plates	E. M. Bigelow, St. Hwy. Com.

STREETS AND ROADS

Evergreen, Ala.—Bids will be received up to 2 o'clock P. M., August 10, 1914, for \$50,000 road improvement bonds of Conecuh County, Alabama, and for 30-year bonds of the denomination of \$1,000, bearing 5 per cent interest, payable semi-annually at Hanover National Bank, New York City. F. J. Dean is Judge of Probate, Evergreen, Ala.

Benson, Ariz.—In order to complete 12 miles of road between Vail and Benson, the last stretch of highway to be filled in on the Tucson-Lordsburg route, citizens of Benson have raised \$1,000 and promise to raise more.

Pasadena, Cal.—Bids will soon be received, it is reported, for one motor truck with oil tank, pump and spreader, having a normal capacity of four tons, not including tank or body.

Red Bluff, Cal.—Supervisors have adopted resolution to purchase sufficient State highway bonds to build State highway from Butte County line north through Los Molinos to Red Bluff, county to build all bridges. Amount necessary to construct this strip of highway is estimated at \$195,000 and Supervisors are prepared to buy bonds to this extent. August 25th was set as date for election to issue bonds to build bridges along route of State Highway.

Sacramento, Cal.—Bids have been received by City Commission on street job that will amount to nearly \$65,000. Work will be for improvement with asphalt of California Boulevard in Elmhurst. Three contractors offered to do the work, Ransome-Crummie Company, McGillivray Construction Company and Clark & Henery Construction Company. Bids will be tabulated and name of lowest bidder announced.

Sacramento, Cal.—Bids will probably be received August 31st for eighty-two and three-tenths miles of State highway in Colusa County, from Berlin to Colusa Junction; Sacramento County, from Folsom to the County Boundary; Solano County from Vacaville to Batavia; San Bernardino County, from Divide to Orcutt; San Bernardino, from Stoney Creek to El Capital; Kern County, from Sly Boundary to Rose Station; San Luis Obispo County, from Atascadero to Paso Robles; Orange County, from Irvine to Santa Ana, and Los Angeles County, from Castail School to Section 17. Bids will be re-advertised for as follows, bids to be opened August 24th. San Bernardino, 6.5 miles, from Orcutt to Santa Maria; San Benito County, 4 miles, from San Juan Bautista to the north boundary; Kern County, 17.3 miles, from Grape Vine Creek northerly in the direction of Bakersfield; San Diego County, 1.6 mile, from La Mesa to Cajon.

Sacramento, Cal.—Action on calling special bond election to issue bonds aggregating \$2,425,000 for improved county highways has been postponed until August 28th. It has been agreed, however, that election will be called early in September.

San Francisco, Cal.—Stanyan St. at its intersection with Golden Gate Park Panhandle will be paved soon with vitrified brick and put into condition for heavy traffic.

San Francisco, Cal.—Board of Public Works decided to have Berry St. improved between 2d and 3d Sts. so that it may be used by heavy teams. A bulkhead will have to be constructed by the State Harbor Board. Cost of the bulkhead is estimated at \$30,000.

Shelton, Conn.—At meeting of Board of Selectmen it was voted to recommend use of native stone and gravel for improvement of both Huntington Center and White Hills roads. This action will be reported to State Highway Commissioner Bennett, and it is believed he will order this material used. By using this style of road it is expected that some-

thing more than 6,000 feet of each highway can be improved with present appropriation, which will cover all worst places in each highway.

Boulder, Colo.—Agreement has been effected between County Commissioners of Boulder and Jefferson for construction of new road between Denver, via Semper and Arvada.

Washington, D. C.—Road will be constructed from Washington to Mount Vernon. Cost, \$60,000.

Jacksonville, Fla.—Citizens will vote on million dollar road bond issue on August 4.

Miami, Fla.—City Council will advertise for laying of 55,000 sq. yds. of paving. Streets south of 6th St. are to be paved. Will call for several kinds of paving, and the kind to be used will be settled upon after the bids are in.

Tampa, Fla.—County Commissioners sometime in August will let contracts for some 36 miles of additional brick paving for county roads. With those contracts let county will have contracted for some 59 miles of brick highways out of the \$1,000,000 bond issue. Contracts to be let embrace Tampa-Plant City road, 14 miles; Harney-Thonotosassa road, eight and eight-tenths miles; Riverview road, 10 miles; Tampa-Port Tampa road, nine and eight-tenths miles.

Canton, Ill.—The Warren County Board of Supervisors voted to conform to the requirements of the State Highway Commission regarding the construction of state-aid roads, and work is expected to be begun as soon as possible on sections A and B. Section A will run 5,500 ft. from end of present hard road south of the termination of South Main St. and is estimated to cost \$13,890. Warren County's share of the expense of construction will be \$6,945. Section B will run for 4,000 ft. west from pavement on Boston Ave. and is calculated to cost \$10,680, the county's share being \$5,340. Plans adopted by board are for roadway 10 ft. in width, to be constructed of brick laid on a concrete base with shoulders of concrete.

Springfield, Ill.—City Commission gave assurances that all hard roads put down by state aid in county will be met in city limits by paved city streets at the earliest possible date. Five streets of city will be affected by the improvement, which will cost approximately \$20,000.

Streator, Ill.—Plans and specifications for paving North Bloomington road have been prepared.

Hammond, Ind.—The First National Bank of Crown Point has bought the \$45,000 gravel road bond series offered for sale by Lake County at \$1.95 premium.

Muncie, Ind.—Contracts for paving streets with brick and alleys with cement were opened, but the awarding was postponed. Following are the bids: For the paving of Liberty St., Birch, \$1.73 sq. yd.; McGrath, \$1.75; Garvey, \$1.75. For the paving of Franklin St., Birch, \$1.73; McGrath, \$1.75; Garvey, \$1.75. For the paving of Gilbert St., Birch, \$1.75; McGrath, \$1.75; Garvey, \$1.90. For the paving of the first alley north of 6th St., McGrath, \$1.55 per lin. ft.; Garvey, \$1.60; Birch, \$1.44. For the paving of the alley back of the new Home Hospital, McGrath, \$2.34; Birch, \$2.19; Garvey, \$2. For the paving of the alley between Main and Jackson Sts., Birch, \$1.57; McGrath, \$1.55; Garvey, \$1.60.

Noblesville, Ind.—The citizens State Bank, of this city, was successful bidder on three issues of gravel road bonds aggregating \$8,320.

Portland, Ind.—Resolutions, plans and specifications for improvement of sidewalk on Ship St. between Water St. and C., B. & C. were ordered; also resolutions, plans and specifications for sidewalk improvement on E. Rodger St. were ordered.

Richmond, Ind.—Petition for the construction of Orlando Marshall road, on line between Wayne and Randolph counties, was approved by commissioners of both counties in joint session. Road will be constructed under the three-mile-gravel-road law. It is estimated that it will cost each county approximately \$6,733. Sept. 12 is date set for the receiving of bids. All of the proceedings will be carried on through the Wayne County Commissioners.

Burlington, Ia.—Council will establish grade above city's datum plane on several streets to aggregate several thousand feet.

Clinton, Ia.—Preliminary action has been taken leading to paving of Third street from Fourth to Eighth avenue.

Dubuque, Ia.—Commissioners appointed by County Auditors of Dubuque and Delaware County to look over feasibility of establishing road 4 miles in length along county line south of Dyersville, have returned favorable report.

Salina, Kans.—An ordinance providing for the construction and repair of certain sidewalks in city has been passed recently by council.

Lexington, Ky.—See Sewerage.

Swampscott, Mass.—Without dissenting voice Swampscott has voted \$20,000 to complete widening and straightening Humphrey street, and to pay for changing approaches to new thoroughfare.

Carthage, Mo.—Stone sidewalks and crossings have been ordered constructed in several streets.

St. Joseph, Mo.—Board of Public Works has determined upon constructing concrete sidewalks on west side of King Hill Ave., from the north line of Klepper's Addition north 265 ft., and contemplates submitting to the Common Council an ordinance therefor.

Billings, Mont.—Montana representatives in Congress are to be asked to request appropriation for construction of automobile highway through part of Yellowstone Park, to connect with road which it is proposed to build from Red Lodge up Rock Creek and into the park by way of Cooke City.

Billings, Mont.—City Council has adopted resolution creating paving district of 1st Ave. north from Division St. to point midway between North 29th and North 30th Sts.

Billings, Mont.—Resolution for construction of alley crossings and approach walks in district roughly described as between North 24th St. and North 22d St. from 8th Ave. north to 5th Ave. north has been provisionally adopted. Work will cost about \$1,290.

Linden, N. J.—The \$150,000 bond issue for improvement of streets has been carried at election.

Albany, N. Y.—Bids will be received until 1 p. m., August 17, for improvement of 14 roads and for repair of 17 roads. Also for sweeping, furnishing and applying High Carbon tar on 5 roads in Erie County. J. N. Carlisle, Commissioner.

Albany, N. Y.—State Commissioner of Highways Carlisle has received bids for construction of new improved highways as follows: In Schenectady County, for Scotia-Ballston Ave. road No. 5496. W. L. Lawton, Glens Falls, \$43,367; Schenectady Contracting Co., Schenectady, \$39,608.50; C. B. Dean, Albany, \$41,621; Brooks & Jullin, Rochester, \$41,251; John Johnson Construction Co., Buffalo, \$43,450; Ballard & Maher, Oneida, \$41,578; William G. Fox, Saratoga Springs, \$43,664.50. In Montgomery County, to repair Hoffman-Cranesville road: J. J. Malloy, Schenectady, \$1,341.65; Harry M. Roberts, Utica, \$1,249.35; Lane Construction Corp., Meriden, Conn., \$1,369.90; Richard Hopkins, Troy, \$1,372.51; John P. Dugan Co., Amsterdam, \$1,944.43; R. D. Cooper, Little Falls, \$1,276.65. To repair the St. Johnsville-Nelliston and Nelliston-Palentine Bridge roads: R. D. Cooper, Little Falls, \$4,414; E. J. Brown, Hempstead, L. I., \$4,

752.50; Lane Construction Corp., Meriden, Conn., \$4,791.50; Harry W. Roberts & Co., Utica, \$4,270; Champlain Construction Co., Saratoga Springs, \$3,995.75; Richard Hopkins, Troy, \$4,706; John P. Dugan & Co., Amsterdam, \$3,937.70. To repair Fultonville Village-Fonda Village-Montgomery and Fonda-Johnstown road: R. D. Cooper, Little Falls, \$6,374.50; John P. Dugan & Co., Amsterdam, \$5,822; J. J. Malloy, Schenectady, \$6,599; Champlain Construction Co., Saratoga, \$5,349.60; Harry W. Roberts & Co., Utica, \$6,187.50; Flood & Van Wirt Co., Hudson Falls, \$6,361; Lane Construction Corp., Meriden, Conn., \$6,656. Also in Montgomery, for repair of the Mohawk River Turnpike-East road: R. D. Cooper, Little Falls, \$2,531; John P. Dugan & Co., Amsterdam, \$2,163.50; Richard Hopkins, Troy, \$2,757.50; J. J. Malloy, Schenectady, \$2,445; Lane Construction Corp., Meriden, Conn., \$2,405; Harry W. Roberts & Co., Utica, \$2,489.40.

Hudson, N. Y.—There were two bidders for purchase of \$14,500 bonds to be issued for repair of Churchtown dam. The Isaac W. Sherill Company, of Poughkeepsie, were highest bidders, their offering being 100.51.

Lockport, N. Y.—Common Council approved the petition for the paving of LeVan Ave. from Cleveland Pl. to the east end of street with asphalt block; also roadway from LeVan Ave. to East Ave. at east end of East Avenue Park and piece of Harrison Ave. cutting through the park to East Ave.

Newburgh, N. Y.—Construction of Storm King road is planned to begin this fall; estimated cost, \$300,000.

Rochester, N. Y.—At meeting of Board of Aldermen following ordinance for street work was adopted: Caprin St. asphalt pavement, \$5,000; Barron St. asphalt pavement, \$3,600; Driving Park tract crosslots sewer, \$4,000; Tonawanda St. and Maple St. widening, \$35,000; Meigh St. asphalt pavement, \$3,000; removing iron poles in Laburnum Crescent, \$500; removing iron poles in Scio St., \$480; McFarlin St. pavement, \$7,000; Penhurst St. walks, grading and sewer, \$11,000; West High School grounds care and embellishment, \$650; Aberdeen St. pavement, \$11,000; Ella St. walks, grading and sewer, \$6,300; Hillendale St. walks, grading and sewer, \$7,000; Main St. East walks, \$9,000; Monroe Ave. cement walks, \$2,000; Norton St. sewer, \$2,900; South St. asphalt pavement, \$22,700.

Rochester, N. Y.—See Sewerage.

Scotia, N. Y.—At special meeting of Village Board street improvement bonds to amount of \$25,000 were sold to George B. Gibbons & Co.

Watervliet, N. Y.—City Engineer Frank J. Keis has completed plans for grading of 12th St. and of 7th and 8th Aves., near 12th St. Improvements will cost about \$3,000.

Elizabeth City, N. C.—Contract has been awarded to G. W. Switzer for paving portion of Main St., at about \$10,000.

Cincinnati, O.—Citizens of Kenton County will be afforded opportunity of voting for or against issuance of a \$150,000 bond issue for purpose of building and reconstructing public roads.

Defiance, O.—State has added \$30,000 additional road money to county fund for extension of Hicksville-Defiance pike. This will necessitate county and township of Mark, putting up like sum, arrangements for that having already been made at original inception of road. Additional mileage will be sold this fall, work to be done next spring and early summer.

Marion, O.—County Surveyor Pearl R. Mears, has announced estimated cost on state aid road work in Marion county on six different roads, approximate total cost being \$151,000. Bids on following roads will be received at office of state highway commissioner in Columbus, August 4: Marion-Kenton pike, beginning at the corporation line and extending west to Big Island, a distance of 20,967 feet; estimate, \$39,400. Marion-Gallion pike, beginning at Marion township line and running east to the old Mud pike, a distance of 13,305 feet; estimate, \$21,800. Columbus-Sandusky pike, beginning at south corporation line of Waldo and extending south to county line, a distance of 6,990 feet; estimate, \$13,500. Marion-Waldo pike, beginning at the south corporation line of Marion and extending south a distance of 11,140 feet; estimate, \$5,800. On Columbus-Sandusky pike, county will only pay for cost of construction of bridges and culverts. This will amount to but \$1,500. On other roads the county and state will each pay half of the cost. Surveyor

Mears has also announced estimates on cost of state aid improvements of Marion-Waldo pike, beginning at corporation line and running north distance of 22,075 feet, and Marion-Marysville pike, beginning at Newman's bridge and running southwest distance of 14,925 feet. His estimate on first of two is \$43,700 and on last named \$26,800. These two improvements have not been advertised and probably will not be built until next year. All of road improvements announced by Surveyor Mears are to be of waterbound macadam.

Pleasant Township, O.—By August 11, citizens will vote on issuing \$50,000 bonds for improving highways.

Sandusky, O.—Sealed proposals will be received at office of City Auditor until 12 o'clock noon, August 25, 1914, for the purchase of bonds of city of Sandusky in the aggregate sum of \$45,000, dated September 1, 1914, payable as follows: Bonds numbers one to fifteen (1-15) inclusive, September 1, 1920; numbers sixteen to thirty (16-30), inclusive, September 1, 1925; numbers thirty-one to forty-five (31-45), inclusive, September 1, 1926, all bearing interest at the rate of 4½ per cent. per annum, payable semi-annually, at the office of the City Treasurer of said city. Said bonds are to be in the denomination of \$1,000 and are issued for purpose of paying the cost and expenses of building, constructing, placing and connecting with water works plant new intake pipe, crib, and system in accordance with plans, profiles and estimates now on file in office of the Director of Public Service.

Sandusky, O.—It was decided by Council to construct sidewalks on several streets of widths varying from 4 to 16 ft.

Tiffin, O.—A resolution asking for a vote on issuing \$100,000 bonds for road improvement in Clinton Township has been filed with the election board. From large number of signatures attached to resolution it is believed that proposition will carry with a big majority. According to latest report of State Highway Commission there are eight inter-county roads in Clinton Township and all are to be asked for repair. Eight roads are: Portland, Fremont, McCutchenville, Fostoria, Findlay, Melmore, North Greenfield and line road between Bloom and Eden Townships.

Tiffin, O.—Sealed proposals will be received at the office of the Auditor of the City of Tiffin, State of Ohio, until 2 o'clock p. m., Thursday, the 20th day of August, 1914, for purchase of bonds of said city in the aggregate sum of \$34,500, dated July 1, 1914, payable as follows: 1 \$500 bond due 1916; 2 \$500 bonds due 1917; 2 \$500 bonds due 1918; 1 \$500 bond due 1916; 1 \$500 bond due 1917; 1 \$500 bond due 1918; 2 \$500 bonds due 1919; 2 \$500 bonds due 1920; 1 \$500 bond due 1921; 2 \$500 bonds due 1916; 2 \$500 bonds due 1917; 2 \$500 bonds due 1918; 3 \$500 bonds due 1919; 3 \$500 bonds due 1920; 3 \$500 bonds due 1921; 2 \$500 bonds due 1916; 2 \$500 bonds due 1917; 2 \$500 bonds due 1918; 3 \$500 bonds due 1919; 3 \$500 bonds due 1920; 4 \$500 bonds due 1921; 4 \$500 bonds due 1916; 4 \$500 bonds due 1917; 4 \$500 bonds due 1918; 4 \$500 bonds due 1919; 5 \$500 bonds due 1920; 5 \$500 bonds due 1921. The above bonds bearing interest at the rate of 5 per cent. per annum, payable on the first day of September, 1915, and semi-annually thereafter March 1 and September 1 in each year.

Youngstown, O.—Good roads commissioners awarded contract to James McCarron to macadamize Bond St. road on Coitsville township line, his bid being the lowest.

Bartlesville, Okla.—Paving of about 20 blocks of streets and 7 blocks of alleys is contemplated. J. McMullen is Comr. Highways.

Altoona, Pa.—Purchase of asphalt mixer is being urged.

Altoona, Pa.—At special meeting of City Council legislation for paving number of thoroughfares introduced on June 22, will come up for final passage and will doubtless be enacted. Thoroughfares to be paved are as follows: 24th St., between North Ninth and West Chestnut Aves.; 15th St., between 11th and 13th Aves.; 14th St., between 11th and 13th Aves.; Washington Ave., between 22d Ave. and the city line, and Chestnut Ave. between First St. and the city line.

Chester, Pa.—John Hanna & Sons, contractors of this city, have been awarded contract for constructing drives, walks, concrete bridge and work on the lake or pond by executors and trustees of the A. O. Deshong Memorial Park. Bids submitted by firm were \$23,000 and \$24,000.

Harrisburg, Pa.—Ordinances were passed authorizing the following: Paving

and curbing of Ethel St. from 18th St. to 19th St.; opening and grading Market St. from 21st St. to the eastern city line.

Philadelphia, Pa.—Bids for work upon city streets amounting to approximately \$430,000 were opened by Chief W. H. Connell, of the Bureau of Highways. In contracts were included paving, repaving, resurfacing and country road work in addition to grading. Among low bidders for asphalt work were Barber Asphalt Co. and Union Paving Co. Bulk of country road work, consisting of coating roads with a bituminous binder, went to Union Paving Co. Cunningham Paving Co. and Mack Paving Co. were low bidders on the greater part of vitrified block work. Paul J. Snyder & Co. submitted lowest bid for resurfacing roads with waterbound macadam. Contracts for resurfacing of country roads were awarded to J. F. Shanley, D. Webster Anders and S. H. Dean, and the grading work to Peoples Bros., S. J. Lynch and Dwyer & Co.

Pottsville, Pa.—City Council has received almost 200 bids on different kinds of material embraced in proposed paving of W. Market street from Fourth to 12th streets, and Logan street from E. Norwegian to Arch street, along with the excavating, the curbing, etc., the bids describing several kinds of wooden block and vitrified brick, etc. There were eight bidders; bids were from M. A. Mangin, Pottsville; Robert W. Henson, Geneva, N. Y.; Franklin Contracting Co., New York City; Dallas Construction Co., Geo. Dallas, Tampaqua; W. H. Lyons, Sunbury; D. Webster Anders, Phila.; Daniel J. Lynch, Phila.; J. B. Trexler, Reading.

York, Pa.—City Council has taken steps to spend \$200,000 appropriated for paving of certain streets with bitulithic and for completion of sanitary sewer system.

Bastrop, Tex.—Roads are now to be built in Precinct No. 1 of county with carrying of the bond election here. It is expected work will be taken up in short time.

El Paso, Tex.—Sum of \$8,000 has been set aside by City Council to be expended for parking 8th St. on both sides of canal, from Santa Fe St. to Cotton Ave., or a little over one mile.

Milford, Tex.—Bond issue of \$4,000 has been approved for street improvements.

CONTRACTS AWARDED.

Lamoine, Cal.—Two sub-contracts have been let on Lamoine-Sims unit of State Highway by F. Rolandi, of San Francisco, to whom State Highway Commission had awarded contract for grading the 9.9 miles for \$63,500. E. R. Burtis and Charles Wagner of Redding have taken contract to grade 3 miles directly south of Sims, on Hazel Creek. Rest of unit, or 7 miles directly north of Lamoine, has been let to Rossi, Moretton & Armellino of San Francisco. Contract for grading and excavating the 16 miles between Bayha and Antler, on Sacramento, has been awarded to Palmer & McBride for \$166,000. As bridges are to be built and road topped off with a wearing surface, the road between Bayha and Antler will cost \$200,000, if not more.

Sacramento, Cal.—To Clark & Henery, of Sacramento, contract for improvement of California Boulevard in Elmhurst.

Sacramento, Cal.—Contracts for Yolo Basin trestle, from Sacramento to Davis, and section of State Highway in Shasta County, have been awarded by Advisory Committee of State Highway. Contract for the construction of Yolo Basin bridge was awarded to Graff Construction Company, of Seattle. This concern entered bid of \$239,703.80, and the engineer's estimate was \$248,385.63. The Palmer & McBryde Construction Company, of San Francisco, was awarded bid for construction of Division 2, Route 3, Sections B2 and C, in Shasta County, between Bayha and the Sacramento River. Palmer & McBryde bid \$166,216.40, and the engineer's estimate was \$170,526.03. Carnahan & Mulford, of San Francisco, entered a bid of \$168,477.58. Others who bid on Yolo Basin road were: Van Sant-Houghton Company, of San Francisco, \$243,977.35; Sound Construction Company, of San Francisco, \$245,309; Mahoney Brothers, of San Francisco, asked \$260,868.35.

Middletown, Conn.—To F. Arigoni & Bro., of Middletown, for paving of Grand St., Mt. Vernon St., and Rapallo Ave., with concrete, at about \$8,000 or \$9,000.

Wilmington, Del.—The Levy Court has opened bids for construction of two new macadam roads in lower part of county. One of these roads will be 1.3 miles in

length, leading from Blackbird Village to a point about 1,000 ft. beyond Blackbird station, in Blackbird and Appoquinimink hundreds. Other road will be 3.425 miles long and will extend from Boyd's Corner to the town limits of St. Georges, in Red Lion and St. Georges hundreds. The bids, which were referred to the committee of the whole, follow: Bidders for the old State road were: Burk & Bonham, Thomas R. Claringbold, Concoran Construction Co., Humphrey & Bentley, B. F. Wickersham, Stewart & Donohue, Juniata Paving Co., A. H. McDowell, O'Neal & Frederick, and D. Webster Anders. Bidders for Blackbird station road were: A. H. McDowell, A. G. B. Anderson, Thomas Claringbold, Juniata Co., Humphrey & Bentley, Burk & Bonham, B. F. Wickersham, D. Webster Anders and John A. Clark.

Chicago, Ill.—By Board of Local Improvements contracts for cement sidewalks and paving streets awarded to Albert Graff, General Cement Construction Co., A. P. Larson, A. C. Skafford, F. K. Shobe Paving Co., Daniel Ryan, Hanson-Unduee Co., Central Paving Co., Peter J. O'Brien, Calumet Coal & Teaming Co., James A. Sackley Co.

Decatur, Ill.—To McCalman Construction Co., at \$18,207, for paving of Taylor Ave. in Highlawn addition, and to S. A. Tuttle, at \$20,239, for paving of Oakland Ave., West William and West North Sts.

Dolton, Ill.—For concrete pavement on 144th Pl., to John Shilling, South Holland, at \$4,443.

Peoria, Ill.—Contract for Knoxville road job has been awarded by State Highway Commission at Springfield, to Canterbury Brothers, \$12,529. This was only bid under estimate prepared by commission calling for improvement of one and one-fifth miles of roadway. The Barnswolt Construction Company bid \$15,385, and the Shugart-Munson Company, of Nevada, Iowa, bid \$14,280.

Springfield, Ill.—Contracts for State aid hard roads were let by the State Highway Commission, as follows: Coles County, Section A—E. M. Laing Co., Highland Park, \$13,989; Stephenson County, Section A—Gund-Graham Co., Freeport, \$12,789; Logan County, Section A—John Awe, Lincoln, \$3,566; Section C, W. D. Alexander & Co., Normal, \$9,622; Section D, John Awe, Lincoln, \$5,569.23; Tazewell County, Section A—A. K. Rhoades & Co., Lincoln, \$7,729.31; Section C, W. D. Alexander & Co., Normal, \$2,738; Lee County, Section A—E. M. Laing Co., Highland Park, \$16,449; Menard County, Section A—E. E. Brass, Petersburg, \$4,860.

Springfield, Ill.—State Highway Commission has let contracts for construction of new State road stretches in eight counties. Contract figures do not include cost of cement. Contracts were awarded in following cases: Cook County—Route 38, Bloodgood & Somerville, of Harvey, \$13,400; route 32, same company, \$4,700; route 3, W. J. Walter, of Glencoe, \$44,900; route 29, Illinois Hydraulic Stone and Construction Company of Elgin, \$43,900. Woodford County—W. D. Alexander & Co., of Normal, \$12,436. Iroquois—Davis-Ewing Construction Company, \$16,980. Schuyler—H. C. Holmes, of Macomb, \$7,166. Bond—Robert Curdie, of Alton, \$7,290. Vermilion—Carter Bros., of Danville, \$47,660. Peoria—Canterbury Bros., of Peoria, \$12,529. Champaign—C. A. Michael, of Mattoon, contracts for two stretches, one \$12,678, and another for \$14,500.

Muncie, Ind.—By Board Public Works, two contracts for cement sidewalks was awarded to the Willard M. Birch Co. One bid was 49½c. and the other 51½c.

Waterloo, Ia.—To E. Leckington for laying the three miles of cement walk. He submitted bid of 45½ cents. for 5 ft. 4 in. sidewalks and 45½ cents for 5 ft. alley crossings. A. G. Picken, Dearborn Construction Co., Mitchell & Hawyer and W. T. Owens also submitted bids.

Rockland, Me.—Bids were awarded by State Highway Commission as follows: Town of Waldoboro, section No. 1, 3.07 miles, F. H. Marshall, South Portland, \$15,725.63; town of Warren, section No. 2, 2.77 miles, A. D. Bridges Sons, Hazardville, Conn., alternate bid, \$16,500. Bids for the towns of Dover, New Limerick and Houlton were thrown out on account of excessive expense. No action was taken on bid for the town of St. George, as it is one which chiefly concerns the town of St. George only and acceptance of contract is optional with it.

Holyoke, Mass.—Board has accepted proposal of Daniel O'Connell Sons for Roman road paving with 5½-inch base in Hampden street for \$1.25 a yard.

Grand Rapids, Minn.—For constructing 6 miles of Big Fork-Hill City Release Road, by County Board, to Louis Leimer, Cloquet, at \$8,900.

Capa Girardeau, Mo.—T. J. Shorb, master paver, was given contract by council to pave North Fountain street between Broadway and North street, two blocks. There were three other bidders. Street is to be paved with concrete. Figures of bidders were: T. J. Shorb—Grading, \$306.00; concreting, \$3,549.23; curbs and gutters, \$309.75; sewer, \$65.00; total, \$4,229.98. Harmon Loeffel—Grading, \$293.15; concreting, \$3,439.46; curbs and gutters, \$442.50; sewer, \$65.00; total, \$4,240.11. F. W. Keller—Grading, \$306.00; concreting, \$3,549.23; curbs and gutters, \$427.10; sewer, \$72.00; total, \$4,354.33. J. H. Rouse—Grading, \$255.00; concreting, \$3,622.41; curbs and gutters, \$398.25; sewer, \$63.00; total, \$4,338.66.

Billings, Mont.—The Warren Construction Co. has been awarded contract for paving of First Ave. north from North 21st St. to eastern city limits. Bid was \$14,834.60. District will be paved with gravel bitulithic. Wesch & Berry submitted bid of \$15,861.10, proposing to pave avenue with concrete.

Billings, Mont.—To F. B. Connelly Co. at \$632 for concrete mixer. Machine will be used in small paving jobs undertaken by city.

Great Falls, Mont.—To Nilson-Smith Co., of Great Falls at \$1,210, for construction of pavement in Fifth alley.

Stevensville, Mont.—To Lord Construction Co., of Hamilton, at \$7,742, for work in two improvement districts, cement walks, curbs, grading, etc.

Bayonne, N. J.—Six bids were received for improvement of 56th St., and contract was awarded to McCabe Bros., whose bid of \$4,313.05 was lowest.

Passaic, N. J.—To Union Building & Construction Co., at \$37,425, for laying of sheet asphalt paving in Hope Ave.

Albany, N. Y.—Bids for County Highway 1207, being 1.28 miles of brick paving at Croton-on-Hudson, on Riverside Ave., have been opened. Contractor John J. Hart, of Main St., was successful bidder, his bid being \$34,395. There were eleven bids submitted on the job, ranging from \$39,674.50 down to Mr. Hart's figures.

Albany, N. Y.—Eleven bids have been received by State Highway Commission for improving of Croton-on-Hudson-Riverside Ave. road in Westchester County. This road is 1.28 miles long. Lowest bid was submitted by a Peekskill firm. Bids were as follows: E. T. Eggleston, Yonkers, N. Y., \$36,119.50; Young & Hyde, Inc., New York City, \$39,674.50; Price & Tripp, Inc., White Plains, N. Y., \$36,272; Sutters & Caesar, Ocean City, N. J., \$37,702.93; Wm. F. McCabe Contracting Co., White Plains, N. Y., \$35,927.50; Lounsbury & Sons, Peekskill, N. Y., \$38,400.50; John J. Hart, Peekskill, N. Y., \$34,395; Samuel Beskin, Beacon, N. Y., \$36,187.50; John L. Hayes Contracting Co., Yonkers, N. Y., \$37,147.25; Joseph Johnson & Sons, West New Brighton, S. I., \$35,205.01; McDonald Contracting Co., New York City, \$36,854.50.

Brooklyn, N. Y.—At opening of bids at office of Borough President of Queens, for borough improvements, contracts for delivering 70,000 cubic feet of hot asphalt mixture went to Sicilian Asphalt Paving Company, at \$27,825. Lowest bidder for laying cement sidewalks on both sides of Myrtle avenue, Ridgewood, from Brooklyn line to McComb place, was awarded to Ganford Company, at \$11,331. Award for furnishing 5,000 cubic yards of broken stone and screenings of trap-rock, was awarded to Peace Brothers, at \$11,500. For grading and laying sidewalks in Thedford street, Richmond Hill, from Chichester avenue to Kimball avenue, the contract will go to the Interboro Improvement Company, at \$3,200. Charles A. Meyer & Co. were successful bidders for grading and laying sidewalks in Cooper street, Ridgewood, from Irving street to the Brooklyn line, at \$378.

North Tonawanda, N. Y.—To Constantine Construction Co., of Buffalo, N. Y., at \$31,839, for paving of Oliver St., and to L. H. Gipp, Buffalo, at \$7,936, for paving of Zimmerman St.

Rochester, N. Y.—The Ribstein-Holter Co. was one of bidders on Holland-Glenwood Point road improvement in Erie County, at \$53,707.80, while that of Serviss & Mackey, of Youngstown, was \$53,516.30. On Pittsford Village-Monroe Ave. and Main St. East road, .92 miles long, there were several Rochester bidders, but J. B. Hurley, of Fredonia, was low with bid of \$26,524.50. James F. Leary bid \$27,842.50; Ribstein-Holter Co., \$27,316.50; Morrison & Quinn, \$27,859.20; Schroeder-Hicks Co., \$27,355; Whitmore,

Rauber & Vicinus, \$27,585.50; Bishop Construction Co., \$29,228.20; Brooks & Julian, \$27,825; Frank B. Brotsch, \$27,860.

Rochester, N. Y.—For paving, by Board Contract, as follows: Murray St., with brick, Thomas Holahan, \$4,451; Newcombe St., brick, H. N. Cowles, \$6,222; Garfield St., asphalt, Rochester Vulcanite Paving Co., \$21,025; Lorenzo St., brick, Thos. Holahan, \$5,810; Texas St., brick, Ribstein-Holter Co., \$14,927; Springfield St. sewer, walks and grading, Passero & Petrossi Co., \$5,486; Culver Road, bitulithic pavement, Thomas Holahan, \$18,936.

Cleveland, O.—For paving Loyal Oak Road, by County, to Portage Engineering Co., Cleveland, at about \$50,000.

Geneva, O.—County Commissioners have let contract for Austinburg improved road to B. F. Hewit, for \$13,701.91. New road will be 2.48 miles long from Austinburg Village east to the Jefferson township line. It will be tar top concrete road ten feet wide.

Lorain, O.—Following paving contracts have been awarded to Ohio Eng. Co. as follows: E. 31st St., with stone-filled sheet asphalt, 2 ins. thick, 81 cts. per sq. yd., total \$25,611; E. 28th St., with brick paving, 4-in. Wooster block, at \$1.08, total \$35,195. C. M. Osborn is City Engineer.

Johnstown, Pa.—To Central Construction & Supply Co., of Harrisburg, for paving with asphaltum of approximately 38,000 sq. yds. of city streets, at \$2.05 per sq. yd.

Seranton, Pa.—To Gaynor Contracting Co., for repairing of the city's asphalt streets for the balance of year, at \$1.15 a sq. yd. for resurfacing and \$2.15 a sq. yd. for resurfacing on new concrete base.

Alexandria, S. D.—To H. E. O'Brien of Emery, S. D., at \$2,000, for construction of four miles of earth road.

SEWERAGE

San Francisco, Cal.—The finance committee of Board of Supervisors has recommended passage of ordinance calling for bids for construction of Baker's Beach outlet sewer, the Fulton St. sewer from the Great Highway to 48th Ave., the Glen Park extension sewer and the Fifth St. sewer from Brannan to Channel. The estimated cost of all the work is \$130,000.

San Francisco, Cal.—Works Board approved City Engineer's recommendation that remainder of the sewer bond fund be used for constructing sewers as follows: In Glen Park between Burnside and Brompton Aves., the estimated cost being \$20,000; 5th St. from Brannan to the channel, \$65,000; Fulton St. from 48th Ave. to the Great Highway, and 46th Ave. from Sutro Heights to Fulton St., \$20,000.

Bridgeport, Conn.—Bids for several sewer contracts have been rejected and will be readvertised.

Stamford, Conn.—Board of Appropriation and Apportionment adopted resolution approving proposed erection of sewage reduction plant and public dock on Canal, along lines suggested in report of special committee on sewage disposal, and appropriating \$4,000 for plans and preliminary work to be done by J. C. Harding a consulting engineer of New York. Bond issue of \$4,000 was approved and mayor authorized to borrow that amount meantime, on an emergency note.

Pensacola, Fla.—Should the estimates which have been prepared by city engineer be carried through, and they all cover urgent items, city will be called upon to spend about \$15,000 on sewer on DeVilliers St.

Jefferson, Ga.—Question of issuing bonds for water works and sewerage in city of Jefferson has been decided by election, the vote being 148 for and 14 against. City will at once enter into work of installing the plants.

Chicago, Ill.—A boulevard extension of some 25 miles that will develop a section of Chicago that is now largely unimproved is plan of President William F. Grower and members of West Park Board.

Springfield, Ill.—Provision for extension of Ridgeley sewer 600 ft., to cost approximately \$2,000, was made by City Commission.

La Porte, Ind.—Board of Public Works has decided to build about a thousand feet of sewer.

Audubon, Ia.—City will construct about 7½ miles of sanitary sewers and sewage disposal plant. P. A. Edquist, 856 Omaha National Bank Bldg., Omaha, Neb., is Engr.

Clinton, Ia.—Council has decided to build sewer.

Council Bluffs, Ia.—City Council is planning construction and reconstruction of various sewers.

Ottumwa, Ia.—By City Commissioners 13 paving jobs to local contractor, J. C. Brunk, at \$2.15 for new work and \$1.46 for resurfacing. All is brick pavement. Job entails expenditure of some \$90,000.

Hurlock, Md.—Bonds in sum of \$23,000 have been voted for sanitary sewerage and sewage disposal plant.

Rochester, Minn.—Plans are being prepared for constructing 1½ miles of 10 to 15-in. sanitary sewers in various streets. T. O. Sullivan is City Clk.

Sioux Falls, Minn.—Resolution declaring the necessity of constructing sewers in several streets were passed by Council.

St. Paul, Minn.—The Jessamine street sewer contract will be relet. It will extend from Woodland avenue to Trout Brook and will cost about \$2,500. This is sewer upon which Contractor C. A. Nelson made a mistake of \$1,000 and was relieved of his contract.

Billings, Mont.—Petition requesting creation of sewer district from alley between Minnesota Ave. and First Ave. south to Fifth Ave. south and from South 27th to South 24th Sts., has been received. District includes about eleven blocks and cost of sewer will be approximately \$4,000.

Billings, Mont.—Ordinance calling for bids on sewer district bounded by North 32d St., Grand Ave., Ave. H. and the city limits has been passed. Bids will be received August 18. Work must be completed January 1. Cost is estimated at \$18,000.

Passaic, N. J.—The \$343,000 issue of bonds to cover payments on Passaic's share of trunk sewer, will be sold publicly at City Hall. City Comptroller James H. Woods will open the sale at 3 o'clock.

Trenton, N. J.—Commissioners have passed ordinance to construct sewers and drains in several streets.

Binghamton, N. Y.—At next meeting of Common Council, ordinance is to be introduced declaring intention of Council to construct sewer along east bank of Chenango river from point above Ferry street bridge to station below Court street bridge which will care for sewers now emptying into Chenango river from Wall street.

Rochester, N. Y.—Board of Contract and Supply has awarded 12 improvement contracts, among them being one for Winton Rd' sanitary storm water sewer, which went to L. H. Brotsch for \$65,280. Contract for Culver Rd. bitulithic pavement was awarded to Thomas Holihan for \$18,936. Other awards follow: Covering Thomas Creek overflow sewer, Whitmore, Rauber & Vicinus, \$8,900; Murray St. brick pavement, Thomas Holihan, \$4,451; Newcombe St. brick pavement, H. N. Cowles, \$6,222.50; Garfield St. asphalt pavement, Rochester Vulcanite Paving Co., \$21,025; Lorenzo St. brick pavement, Thomas Holihan, \$5,310; Texas St. brick pavement, Ribstein-Holter Co., \$14,926.50; Springfield St. sewer, walks and grading, Passero & Petrossi Co., \$5,485.50; laying water pipe in Group No. 259, Passero & Petrossi Co., \$1,849.20; Folsom St. sewer, walks and grading, Passero & Petrossi Co., \$2,504.25.

Salem, O.—Ordinance has been passed for construction of sanitary sewer on Evans street between Union street and Park street, another ordinance.

York, Pa.—City Council has taken steps to properly spend \$200,000 appropriated for completion of sanitary sewer system and paving of certain streets of city with bitulithic.

Huron, S. D.—It was recently resolved by commissioners that lateral sewer be constructed in Kansas St. from 9th St. to 12th St., as per plans and specifications in office of city engineer, and that auditor be hereby instructed to advertise for bids.

Yankton, S. D.—Resolutions were passed by Board of Commissioners declaring necessity of connecting sewers on Broadway from 3d St. to 4th St., and on 3d St. from Broadway to Mulberry St.

Brenham, Tex.—Sewer bonds in sum of \$16,000 have been sold.

CONTRACTS AWARDED.

Los Angeles, Cal.—To John Balch, at \$196,998, for contract to construct Madison-Virgil storm sewer in Santa Monica Blvd., Madison avenue, and other streets.

Daytona, Fla.—Bids have been received for construction of proposed drainage and sewage system. Bids of

various competing companies were in unities under 12 different heads or contracts, which were awarded as follows: Contract No. 1.—To the Bibb Sewer Pipe Co., of Macon, Ga. This was for furnishing vitrified pipe. No. 2.—United States Cast Iron Pipe & Foundry Co., Chattanooga, Tenn., cast iron pipe. No. 3.—J. G. Christopher Co., Jacksonville, galvanized steel pipe. No. 4.—Gibbs Gas Engine Co., Jacksonville, furnishing oil engines and appurtenances. No. 5.—N. C. Walpole, New York City, furnishing centrifugal pumps and appurtenances. No. 6.—N. C. Walpole, New York City, furnishing air compressors and appurtenances. No. 7.—Sanitation Corporation, New York City, furnishing Riensch sewerage screen. No. 9.—Gibbs Gas Engine Co., Jacksonville, installing machinery in sewage pumping station. No. 10.—Guild & Co., Chattanooga, Tenn., excavation and re-fill, concrete, steel reinforcement, rock excavation and pumping station superstructure. No. 11.—Shone & Co., Chattanooga, Tenn., actual construction work, including all necessary material for the work.

Carrollton, Ill.—By Board Local Improvement, for constructing sanitary sewer and disposal plant, to Driscoll & O'Brien, Decatur, at \$29,487. Work consists of approximately 40,128 lin. ft. 16 to 6-in. pipe sewer, 1,500 lin. ft. raised house connections, 6 standard design flush tanks, 3 shallow design flush tanks, outfall abutment and reinforced concrete sewage disposal plant, etc.

Ft. Dodge, Ia.—Members of City Council let two small contracts for sanitary sewers in southeastern part of the city. Benson & Reed were given the contract for District No. 1 and Claus A. Kling for District No. 2. Sanitary sewers on 20th St., from Sixth to Eighth Aves. south, were ordered.

Fitchburg, Mass.—For constructing lateral connections and about 800 ft. of 72-in. storm sewer to Frank A. Gamline at \$37,880. Other bids were: McCarthy & Walsh, Boston, Mass., \$39,453; W. J. Donovan, Fitchburg, \$40,611; C. E. Trumbull Co., Boston, \$42,934; Long & Little Leominster, Mass., \$45,494; Donovan Bros., \$49,621. David A. Hartwell is Chief Engr.

Ortonville, Minn.—To H. B. Rosworth, of Ada, Minn., at \$4,340, for 4,747 ft. 6-in. pipe, 732 ft. 8-in. pipe, 12 manholes, 4 lamp holes, etc.

Rochester, N. Y.—See "Miscellaneous."

Watertown, N. Y.—Burns Brothers & Haley have presented low bid for construction of Hamilton street sewer for relief of Arlington street sewer, at adjourned regular meeting of Board of Public Works. The bids were referred to the city engineer to compute. Bids of Burns Bros. & Haley was \$6,448.70. Four other bids were presented as follows: Thomas O'Brien, \$7,250.82; Hodge Foster, \$7,915.94; Gooley & Allard, \$7,975.75; William O'Neill, \$8,164.30. Contract will be awarded at a later meeting.

Johnstown, Pa.—Council awarded to Baker-Owen Const. Co. contract for laying a sewer in Bedford St. from Solomon Run to eastern city line.

Dallas, Tex.—Bid of Dallas Lime & Gravel Co. on construction of storm sewer on Grigsby Ave. between Bryan and alley north of Gaston was accepted by the Board of City Commissioners. The successful bid was \$12,186.50. Winslett-Eldridge Co. bid \$12,532 and C. W. Olcott, \$13,670.90. Contract for furnishing city with 75 6-in. three-way and 25 4-in. three-way fire hydrants went to Rensselaer Valve Co., of Troy, N. Y. The bid was \$26.95 for the large and \$22.70 for the small hydrants.

Dallas, Tex.—For constructing sanitary sewers in East Dallas to C. W. Olcott, at \$17,213. Other bids were: F. M. Long, \$19,522; Ennison & McCord, \$25,453; Winslett-Eldridge Co., \$22,567; Dallas Lime & Gravel Co., \$17,507.

Norfolk, Va.—To Standard Oil Co. for furnishing gasoline to be used at sewer pumping station for next six months at 12½ cents per gallon.

Seattle, Wash.—Following bids were opened: 42d Ave., S. W., sewers—L. Coluccio, \$23,958.83; C. Cristoforo, \$22,706.35; John Allemandi, \$22,384.70; Geo. W. Walker, \$23,241.40; W. G. Jones, \$26,722.50; H. Young, \$27,007.80; Dahlstrom & Rodal, \$19,143; A. M. Florito, \$26,642.95; Auburn Pl. paving—Park Contracting Co., \$3,278.17; C. C. Crane, \$3,396.79; D. H. Trapnager, \$3,525.90; W. C. Pedlar, \$3,539.52; A. J. Baumgartner, \$3,734; Elliott Const. Co., \$3,790.10; W. F. Meisner, \$3,834.25; California Ave., paving—F. McLellan, \$109,820.20; K. Sauset, \$118,067.50; R. G. Stevenson, \$123,559.15; A. J. Baumgartner, \$123,361.40; P. J. McHugh, \$134,846.26.

WATER SUPPLY

Pasadena, Cal.—Samuel Morris, engineer of water department, is preparing plans for a water purification plant. Chloride of lime will be used and cost will be about \$1,500.

Placerville, Cal.—Supervisors have appointed Clifford B. Rushmer, Superintendent of Construction on State Highway Webber Creek bridge, to draw plans for retaining dam, to impound waters of Webber Creek, for irrigating purposes.

Sacramento, Cal.—Specifications have been adopted for extension of water mains out J street from Thirty-first to Tullar avenue.

Canon City, Colo.—At last meeting of City Council it was decided to resand filtration reservoir of water system as soon as arrangements can be made for work.

Wilmington, Del.—It is proposed by Board of Water Commissioners to build additional reservoir on Weldin Farm, adjoining the Porter reservoir.

Wilmington, Del.—Wilmington's Water Department has been allowed an additional \$50,000 by City Council to defray expenses of installing water meters, making total of \$100,000 to be expended for this work.

Columbus, Ga.—Representatives of Columbus Water Supply Company, of which John B. Weakley of Birmingham is president, and the Columbus commission, have agreed upon terms of sale of Georgia property of the former to the latter, price to be paid being \$325,000.

Jefferson, Ga.—See Sewerage.

Sterling, Ill.—Bids on proposed Oregon dam to be built by Illinois Northern Utilities Company, have been received. It will be improvement amounting to something like \$75,000.

Lawrence, Kan.—An entire new water works system for Lawrence is foreshadowed in the proposition to submit to people in near future proposition to issue \$350,000 in bonds to be issued for water works construction. Plan has been under way ever since desperate water situation following effective sealing of the present company's river pipe developed, and details are being worked out as rapidly as possible, and plan probably will be submitted to people this summer.

Hurlock, Md.—Citizens of Hurlock, by decisive vote of 88 to 26, have approved a \$45,000 bond issue, with proceeds of which they plan to build efficient water works system, costing about \$19,000, and sanitary sewerage and sewage disposal plant, costing, approximately, \$23,000. It is felt by some that remainder should be used for construction of surface drainage sewerage.

Beverly, Mass.—Board of Aldermen have accepted act legalizing \$10,000 bond issue for laying water pipes.

Haverhill, Mass.—Orders for extension of high pressure water service have been presented to Municipal Council by Alderman Bartlett, and they were laid on table for one week. Order for issuance of bonds to amount of \$10,000 to cover cost of extending high pressure water service was also presented.

Westfield, Mass.—Question of increasing water supply is being discussed, and Chas. R. Gow, Boston, is advising committee in charge.

Grand Rapids, Mich.—Improvement of water system is being considered.

St. Paul, Minn.—St. Paul Water Department heads will try out in miniature water purification device for use in Lake Vadnais. Garrett O. House, superintendent of Water Department, was authorized by Water Board to purchase a purification plant in miniature for \$100 and make tests. A plant on a larger scale may be installed at the lake outlet. It will cost about \$10,000.

Billings, Mont.—City Engineer Durland completed necessary field work and surveys for the proposed water purification plant for the municipal system and forwarded them to Burns & McDonnell, consulting engineers. It will consist of three divisions—the concrete settling basin, the filter house and the clear water well.

Havre, Mont.—Installation of filtration plant in connection with water system is under consideration.

Potsdam, N. Y.—Survey of water power and water storage possibilities of Racquette river is being made by engineers of Conservation Commission with special attention to sites available for construction of reservoirs. Entire length of river is being covered. Two excellent sites for construction of reservoirs have been found; one at Racquette

Falls, the other at Racquette Pond. The dam at Racquette Pond would give about 1,000,000,000 storage capacity in the pond. A dam at Oxbow Swamp, if built 50 feet high would give about 115,000,000,000 cubic feet at rough estimate.

Sidney, N. Y.—Plans have been completed by Henry W. Taylor, 100 State St., Albany, for municipal water works, and same have been submitted to State Conservation Comm. for approval. Estimated cost, \$125,000. Julius Hall is chairman, Water Board.

Burgaw, N. C.—See Lighting and Power.

Portland, Ore.—Plans for increasing flow of water during low-water season to maximum carrying capacity of two Bull Run pipe lines will probably be carried out by close of Summer season of 1915. Erection of dam 30 feet in height at headworks, 30 miles east of Portland, will raise water surface at intake and with increased head pipe lines will carry from 2,500,000 to 3,000,000 gallons more than is now possible.

Blairsville, Pa.—Installation of 1,000,000-gal. pump and 4,000 ft. 12-in. pipe is proposed, cost \$20,000. Engineer is E. J. O'Brien. H. R. Wiley is Sec. Boro. Council.

Knoxville, Tenn.—According to Commissioner G. P. McTeer, new laterals for supplying water are to be put in.

Brenham, Tex.—Water bonds in sum of \$15,000 have been voted.

Brenham, Tex.—Bonds will be issued for improvement of waterworks.

Milford, Tex.—Bond issue of \$10,000 has been approved for waterworks.

Aberdeen, Wash.—Officials decided to secure a permanent water supply for the cities of Aberdeen, Hoquiam, Cosmopolis, Elma and Montesano from the headwaters of the Wynooche River, and instructed engineers of these cities to prepare charts outlining the territory to be embodied in proposed water district in conjunction with the attorneys of these cities.

Snohomish, Wash.—Work of laying new water mains and lining old reservoir will be done by city in accordance with the action taken by City Council at regular meeting. The cost of the new pipe and the cost of laying will be about \$9,060.89, the amount estimated by the city engineer. Materials to be bought on open market.

CONTRACTS AWARDED.

Daytona Beach, Fla.—For construction of water works system, following contracts were awarded: To Chattanooga Boiler & Tank Co., contract to erect a 50,000-gallon steel tank on steel tower, 89 ft. to balcony, price being \$2,411. The Central Foundry Co. will furnish the pipe, council deciding to use universal pipe instead of the bell and spicket pipe. A Vandevord was given contract to build foundation for tank and tower, and engine and pump foundations. Price for the tower foundation is \$405, and engine and pump foundations \$6.18 per cu. yd. The Gibbs Engine Co. will furnish two 30 horse-power Stover engines for \$2,050. The same company will also furnish one pump with a 9½-in. bore and a 12-in. stroke for a price of \$1,320, including all fittings.

Lagrange, Ga.—By D. Edmundson, Mayor, for water works station, filters, machinery and extensions, to Municipal Eng. & Const. Co., Atlanta, and Tucker & Laxton, Charlotte, N. C. James Nisbit Hazlehurst, of Atlanta, Ga., is Consulting Engineer.

Chicago, Ill.—By Board of Local Improvements, contracts for water supply pipes in several streets awarded to Tiritilli & Till; James J. Lynch; Garrett Barry; Theodore Di Vito; Simon Ryan; M. J. Bohan.

Springfield, Ill.—Bids for cast iron water mains were opened by commissioners. The Lynchburg Foundry Co. was lowest bidder, its figure being \$22.75 per ton. Other bidders were American Pipe Co., \$23; Z. B. Clow & Co., \$22.90; and United States Cast Iron Pipe Co., \$23.

Lake City, Ia.—For constructing water works, to Merkle-Hines Machinery Co., Kansas City, Mo., at \$3,935. Bruce & Standevan are engineers, Bee Bldg., Omaha, Neb.

Wapello, Ia.—To M. C. Elligott of Evanston, Ill., at \$2,400, for erection of municipal waterworks plant.

Fall River, Mass.—Mayor Kay signed contract awarded by Watuppa Water Board to Wilson-Snyder Co., of Pittsburgh, Pa., for electric pump. This pump will cost \$4,550 and is to be installed at auxiliary pumping station to be erected.

North Adams, Mass.—Figures received on building of new storage reservoir have been source of considerable satisfaction to city officials. It appears that from lowest bid received that of Middlesex Contracting Co. of Putnam, Conn., the work can be done for \$87,750. This figure is \$656.25 lower than nearest competitor, Framingham Contracting Co., whose bid figures up to \$88,406.25.

Uxbridge, Mass.—Water Commissioners let contract for iron pipe for water extensions to Charles Miller & Son, Utica, N. Y., at \$21.70 per ton for 300 lengths of 6-in. iron pipe amounting to about 65 tons. The contract for 4,000 pounds of lead was let jointly to Richards & Co., of Boston, and Eastern Metal & Refining Co., of Boston, for \$4.15 per 100 pounds.

Chisholm, Minn.—To Massillon Iron & Steel Co., Massillon, O., at \$25.65 per ton, for 70 tons of iron pipe for water department.

Steelton, Mich.—Contract for construction of pumping station at new spring wells at Connaught Park, Steelton, was let to McIntyre, Haining & Kelly. The amount of the contract is \$2,800.

Albany, N. Y.—To James C. Nolan, at about \$38,000, for improvements and additions to pumping station of City Bureau of Water at Montgomery and Quackenbush streets.

Hudson, N. Y.—To Keepsdry Construction Co., New York City, for Churchtown Dam construction, \$11,554. Other bidders: Thomson, Wooster Co., Walden, N. Y., \$12,892.70; Drake & Deane Co., Inc., Buffalo, N. Y., \$12,314.05; A. M. Harper, Inc., Newburgh, N. Y., \$13,097; Barzaghi-Vought Co., Inc., New York City, \$13,954.75; Mason, Hilton & Co., New York City, \$16,962; Suburban Engineering Co., New York City, \$16,619.

LIGHTING AND POWER

Pasadena, Cal.—Installation of ornamental lights on South Lake avenue is being planned.

Pasadena, Cal.—At cost of \$30,000, which will be paid out of earnings, capacity of municipal lighting plant is to be doubled. City Commissioners deciding on this when they gave instructions to call for bids for a steam turbine, 3,000 kilowatt capacity, 50 cycle, 2,300 volts, and also one jet condenser with capacity for taking care of 65,000 pounds of condensed steam per hour and suitable for a 3,000 kilowatt steam turbine. C. W. Kolner is General Manager.

Huntington, Ind.—City Council has voted bonds in sum of \$50,000 for rebuilding municipal electric light plant.

Indianapolis, Ind.—Chief Engineer of City Hospital has petitioned Board of Health to make improvements and extensions to power plant of hospital at cost of \$17,000.

Richmond, Ind.—Following plan is under way for new street lighting system: Installation of ornamental standards at distances of about sixty feet on Main St. from Third to Twelfth; on Fort Wayne Ave. from Seventh to Eighth, and on North E St. from Eighth to Eleventh. To have the wiring for these standards placed in conduits, and each standard surmounted by a brilliant arc lamp, either flaming, nitrogen or luminous arc.

Kansas City, Kan.—An election will be held Aug. 25 for citizens to vote on question of bond issue of \$650,000 for improvements and extensions to municipal electric light and water systems. C. B. Little is City Clk.

Topeka, Kan.—City Commissioners are considering installing municipal electric light plant to furnish electricity for residential and commercial lighting.

Cumberland, Md.—Purchase of new equipment for municipal electric light plant is being considered.

Saginaw, Mich.—The city of Saginaw is considering the installation of a municipal electric lighting station. A new system of street lighting will be installed. Communications should be addressed to Herman H. Eymmer, City Engineer.

Ypsilanti, Mich.—Voters decided at a special election to buy the Ypsilanti gas plant for \$110,000.

Sioux Falls, Minn.—In addition to paving improvements, business district, Sioux Falls, is to have a new system of street lighting, according to action taken by city commissioners in instructing City Auditor Leyse to advertise for bids on the installation of curb lights.

Fort Benton, Mont.—Bids will be received until Aug. 17, by John F. Murphy, City Clerk, for purchase of \$17,000 bonds to be used in constructing electric light plant.

Miles City, Mont.—City Council has under consideration establishment of heating plant, to cost about \$15,000, on either Main or Eighth St. It is proposed to operate plant in connection with municipal light and power plant.

Lyons, Neb.—Plans are being prepared for electric light and power plant by Albert C. Arend.

St. Paul, Neb.—Plans are being prepared for municipal light and power plant and improvements to pumping plant. Bond election soon. Harper & Stiles are Consulting Engineers, Grand Ave., Temple, Kansas City, Mo.

Burgaw, N. C.—Mayor and Commissioners of town are considering proposition to install an electric lighting plant and water works system. As funds necessary for project would have to be raised by bond issue, matter will be left open for some time in order to get expression of sentiment from people.

Hamilton, Ohio.—Plans to expend \$55,000 for a new unit at city electric light plant are being considered by Service Director Jos. Meyers. As department now has \$20,000 available for this purpose, which will be increased to about \$35,000 by end of the present year, it is probable that new equipment will be purchased early next year.

Youngstown, O.—Plans are being discussed for installation of municipal lighting plant.

Drain, Ore.—Plans are being prepared for installation of municipal electric light plant to cost about \$6,000.

Hazleton, Pa.—Council discussed question of lighting courts and alleys of the city and seemed to be of opinion that something should be done and ordinance may be introduced at an early meeting, asking for bids on gas and high power electric filament lights for this purpose.

Seattle, Wash.—Bids for light and power bonds in sum of \$400,000, and steam auxiliary power plant bonds in sum of \$404,000, will be received by corporate authorities of Seattle until noon, Sept. 5.

Spokane, Wash.—City Engineer Morton Macartney has prepared plans for proposed electrolier lighting system.

CONTRACTS AWARDED.

Denison, Ia.—City Council has let contract for installing new municipal lighting plant. Plant is to be completed by December 1. Murray engines and Westinghouse generators were selected. There were 15 bids, all below engineer's estimates. Owing to change in current, a complete change in meters will be necessary. The council will put these in at the city's expense.

Philadelphia, Pa.—For constructing Belmont Pumping Station, under Contract No. 232, as follows: Boilers to the Wickes Boiler Co., at \$55,761; piping, to William Anderson, at \$20,450; blast fans and turbines, to Kerr Turbine Co., at \$3,188; centrifugal pumps, to Dravo-Doyle Co., at \$79,750; miscellaneous pumps, to Earle Gear & Machine Co., at \$5,800; water softening tanks, to John Balzley, at \$5,673, and hydraulic lift, to Robert Wetherill Co., at \$2,232.

Seattle, Wash.—Following bids were opened for the purchase of approximately \$80,000 worth of incandescent lamps for the lighting department: Westinghouse Lamp Co., 36% off list price; General Electric Co. (Shelby Division), 36% off list price; General Electric Co., 36% off list price; Western Electric Co., 36% off list price; Pacific Lamp & Supply Co., 36% off list price. For furnishing two motor driven oil pumps for the lighting department: Puget Sound Machinery Depot, \$900; \$900; Power Plant Equipment Co., \$870.50, \$983.35; Dean Steam Pump Co., \$1,327.55, \$1,327.55; Fairbanks Morse Co., \$1,200, \$1,200; Hallidie Machinery Co., \$1,400, \$1,400; W. R. Hendry Co., for one, \$2,135, for both \$3,795.

Lachine, Que.—For electric wires, to Dietrich, Ltd., Montreal, Que., at \$51,000.

Montreal, Que.—By Board of Control, to G. M. Gest, for construction of underground conduits in St. James, Notre Dame and Craig and intersecting streets, between Victoria Sq. and St. Lawrence, at \$175,000.

FIRE EQUIPMENT

Napa, Cal.—Bonds in sum of \$12,000 have been voted for purchase of motor fire truck and other fire apparatus.

Newcastle, Cal.—Citizens to start popular subscription to purchase fire fighting apparatus. Decided to purchase, providing \$5,000 can be raised, combination chemical and hose wagon and automobile hose wagon.

Stockton, Cal.—Bids will be asked immediately for about 4,200 ft. of hose. W. D. Murphy is Chief.